

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---oOo---

TEXAS INSTRUMENTS INCORPORATED,

Petitioner,

vs.

Patent 7,496,342

PARKERVISION INC., et al.,

Patent Owner.

_____/

**Case IPR2024-00934
Ref. 12189-0090IP1**

REMOTE CONFERENCING DEPOSITION OF DAVID RICKETTS, Ph.D.

Stenographically reported by NICOLE HATLER

California CSR No. 13730

June 25, 2025

THE SULLIVAN GROUP OF COURT REPORTERS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

I N D E X

PAGE

EXAMINATION BY MR. MAGEE.....5

(No exhibits were marked.)

THE SULLIVAN GROUP OF COURT REPORTERS

1 REMOTE CONFERENCING DEPOSITION OF DAVID RICKETTS, Ph.D.

2

3

4

5

6

7

8

9

10

11

12

---o0o---

13

APPEARANCES ALL REMOTELY VIA ZOOM

14

For the Plaintiff:

15

TAYLOR LEPORE
Daignault Iyer
8229 Boone Boulevard, Suite 450
Vienna, VA 22182
(917) 829-0235
TLepore@Daignaultiyer.com

16

17

18

19

20

21

22

23

24

25

JOSHUA A. GRISWOLD
RISHI GUPTA
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
(202) 783-5070
RGupta@FR.com

THE SULLIVAN GROUP OF COURT REPORTERS

1 For the Defendant:

2 ROBERT MAGEE
3 Blue Peak Law Group
3790 El Camino Real, PMB 846
4 Palo Alto, CA 94306
(650) 332-1701
Robert@BluePeak.Law

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

THE SULLIVAN GROUP OF COURT REPORTERS

1 DAVID RICKETTS, Ph.D.

2 sworn as a witness

3 testified as follows:

4 THE REPORTER: Good morning. My name is Nicole
5 Hatler, California Certified Shorthand Reporter No.
6 13730..

7 EXAMINATION BY MR. MAGEE:

8 Q. Morning, Dr. Ricketts. Can you state your name
9 for the record?

10 A. David Shawn Ricketts.

11 Q. Okay. Sorry.

12 A. Sorry. Just going to say, R-I-C-K-E-T-T-S, and
13 S-H-A-W-N.

14 Q. And is there any reason you cannot give true and
15 correct testimony today?

16 A. No.

17 Q. Okay. And you understand that you are here to
18 testify on behalf of the patent owner in IPR No.
19 2024-00934 concerning US Patent No. 7496342; is that
20 right?

21 A. That is my understanding.

22 Q. Okay. And you submitted a declaration in
23 connection with this IPR, and that's Exhibit No. 2021; is
24 that correct?

25 A. That is correct.

1 Q. Okay. And do you have that available to you
2 today?

3 A. I do.

4 Q. Okay. I may, occasionally, refer to exhibits
5 from this IPR proceeding by their Exhibit number in the
6 IPR proceeding.

7 Would you have access to those if I reference
8 them?

9 A. I do. If I don't, then I'll just request to put
10 it in the chat.

11 Q. Okay. That's fine.

12 Okay. If we could turn, then, to your
13 declaration, Exhibit 2021, and I just wanted to go over
14 it a little bit on your professional qualification
15 background section.

16 So if I have it correct, you received your
17 bachelor's of science in electrical engineering in 1995
18 and your master's in electrical engineering in 1997; is
19 that correct?

20 A. That is correct.

21 Q. Okay. And then you received a Ph.D. in
22 electrical engineering from Harvard in 2006, correct?

23 A. That is correct.

24 Q. Okay. And then you worked from 1995 to 1999 at
25 American Power Conversion; is that right?

1 A. Yes. I did take a break from American --
2 American Power Conversion when I worked for Analog
3 Devices doing my master's thesis, but yes. During that
4 period, I was working principally with American Power
5 Conversion.

6 Q. Okay. Focussing first on your -- on American
7 Power Conversion, was any of your work there on RF
8 transceivers?

9 A. At American Power Conversion, no.

10 Q. Okay. And then I know you said in 1996, you
11 worked at Analog Devices.

12 A. That's correct.

13 Q. According to your declaration, that was on the
14 design of 622 megahertz frequency synthesizer; is that
15 correct?

16 A. Yes, for radio frequency systems.

17 Q. Okay. Was that used as part of the LO chain in
18 radio frequency systems?

19 A. That was a general project to generate the
20 multiple oscillating signals that you need for various RF
21 parts. So it was -- it was a standalone cell just
22 generating frequencies for LOs, clocks and other things
23 in RF systems.

24 Q. Okay. And from 1999 to 2001, you worked at
25 renaissance design; is that right?

1 A. That is correct.

2 Q. Okay. And according to your declaration, you
3 worked on power management ICs.

4 Were those used in RF transceivers?

5 A. Those integrated circuits, I principally worked
6 on power management ICs. I did do some projects for some
7 other non-power management, but I don't recall any of
8 them being a radio frequency receiver or transmitter.

9 Q. Do you recall what those other projects,
10 generally, concerned?

11 A. I believe the one that I can recall regarded
12 audio amplifiers.

13 Q. Okay. And then it looks like, from 2000 to
14 2002, you worked on ON Semiconductor; is that right?

15 A. That is correct.

16 Q. Okay. And according to your declaration, you
17 were overseeing the development of 20 power management
18 ICs in a variety of technologies.

19 Were any of those for RF transceivers?

20 A. Those were power management ICs. So we focused
21 on the power portion. They might have been used in a
22 transceiver, but once again, we were just focussing on
23 the power portion. So there was no RF in the chips that
24 we developed there, but they might have been used in an
25 RF system.

1 Q. Okay. And from 2002 to 2003, you were an
2 advanced system engineering manager at ON Semiconductor
3 where you worked on worked -- or worked -- you directed a
4 team of system engineers to develop multi-phase power
5 management ICs; is that correct?

6 A. That is correct.

7 Q. Okay. But that was for Intel and AMD
8 microprocessors, so not for RF transceivers?

9 A. Those, specifically, the main customer base was
10 Intel and AMD processors, but once again, they were
11 general power management circuits.

12 Q. Okay. And in your -- in your declaration, you
13 say, in 2006, you received your Ph.D.

14 Have you been in academia since then?

15 A. Yes, continuous from 2006 to today.

16 Q. Okay. I want to scroll down a little bit. You
17 have sections that provide general and detailed
18 technology backgrounds. Can we go down to the section
19 starting at paragraph 38. I believe it's on PDF page 17.

20 A. Right above it is, Basic circuit concepts?

21 Q. Yes. Yes.

22 A. I'm there.

23 Q. Okay. So this is a section of your report
24 you've entitled, Detailed technology background; is that
25 right?

1 A. Section 7, which this is in, is Detailed
2 technology background.

3 Q. Okay. I want to scroll down a little bit. In
4 paragraph 41 --

5 A. Uh-huh.

6 Q. -- there's, Voltage.

7 Do you see that?

8 A. I do see voltage.

9 Q. Okay. And in this, you say, Negative charges
10 are electrons are naturally attracted to higher voltages
11 while positive charged protons are drawn towards lower
12 voltages.

13 Do you see that?

14 A. Yes. Charges are attracted to their -- their
15 opposite --

16 Q. Okay.

17 A. -- polarity.

18 Q. So negative charges, or electrons, would
19 naturally flow from a negative voltage towards a positive
20 voltage, correct, or from a lower voltage towards a
21 higher voltage?

22 A. So the convention for current is current flows
23 from positive to negative. Electrons do flow from
24 negative to positive as part of that current convention.

25 Q. Okay. So why don't we go down to the next

1 paragraph 42 where you talk about electric current.

2 I believe what you were saying was -- or let me
3 rephrase this.

4 In your declaration, you state, Electric current
5 is the flow/movement of charge within a circuit.

6 Do you see that?

7 A. I do see that paragraph.

8 Q. Okay. And the charge carrying unit that's
9 moving are the electrons, correct?

10 A. In what we referred to as current, the moving
11 conductor in wires is an electron, and we have
12 conventions for direction of current, direction of
13 electrons that we -- we use to describe that.

14 Q. Okay. And if I understood what you're saying a
15 moment ago, conventional current flows from positive to
16 negative, from higher voltage to lower voltage --

17 A. Correct.

18 Q. -- but the flow of electrons is from the lower
19 voltage to the higher voltage?

20 A. Yes. And those are the same convention.

21 Q. Right.

22 A. So current flowing from positive to negative is
23 the same convention as -- let me restate that.

24 In describing that, the current flowing from
25 positive to negative, the electrons are flowing from

1 negative to positive.

2 Q. Okay. And if we can scroll down to page 20 of
3 your declaration, at the top of page 20 there's a section
4 -- or subsection 1 labeled, Transistor.

5 Do you see that?

6 A. I do see that. Yes.

7 Q. Okay. In paragraph 53, you describe two
8 different types of field-effect transistors, JFET, or
9 Junction-gate field-effect transistors and MOSFETs, or
10 metal-oxide-semiconductor field-effect transistors.

11 Do you see that?

12 A. I do see that.

13 Q. Okay. Do JFETs and MOSFETs have the same three
14 terminals?

15 A. They have a drain, a source, and a gate.

16 Q. Okay. And the symbol in paragraph 55 showing
17 the source, drain, and gate, that applies to both JFETs
18 and MOSFETs; is that right?

19 A. They both have the same three terminals. Often
20 the -- the symbols will vary a little bit so that one can
21 see on the schematic it's a JFET or it's a FET, but they
22 do all have those same three terminals.

23 Q. Okay. What's the difference in the -- the, sort
24 of, illustration in the schematic to distinguish between
25 the two?

1 A. Just by way of example, with the references we
2 have, DeMaw shows it as an arrow going into the gate and
3 then two lines. So I've seen it represented a few
4 different ways. A POSITA would understand from the
5 description of the circuit what kind of JFET was used.

6 JFETs are currently less common, but in older
7 references, they were used extensively.

8 Q. Okay. And I'm sorry. I may have misunderstood.

9 The symbol in paragraph 55, is that the symbol
10 for a JFET or for a MOSFET?

11 A. That specific one is for a MOSFET.

12 Q. Okay. And in paragraph 52 of your declaration,
13 you state that some types of transistors can be used as a
14 switch and that transistors can also be used to provide
15 other functions.

16 Do you see that?

17 A. Paragraph 52 describes transistors as being --
18 being used as a switch and also can be used to provide
19 other functionalities, for example, amplification.

20 Q. Okay. Can both JFETs and MOSFETs be used as a
21 switch?

22 A. With the proper setting of all the terminals, I
23 believe it -- most JFETs will be able to be turned off.
24 So JFETs are normally on, whereas MOSFETs are normally
25 off. So we know MOSFETs are always off. But I believe

1 most JFETs can be continued off. You just need to check
2 their data sheet to make sure that's a true statement
3 because they operate on the channel being fully
4 obstructed by the depletion region, and I have to look at
5 the data sheet to see if that's able to completely close
6 it. It may not be able to in all devices.

7 Q. Okay. So I think -- oh, darn it.

8 So in -- I need to scroll down a little bit.

9 In paragraph 199 of your declaration, which is
10 on page 70, let me know when you're there.

11 A. One moment. I am at figure 199.

12 Q. Okay. In paragraph 199, we're talking about the
13 Vgs of the transistors in DeMaw.

14 The -- the transistors in DeMaw are JFETs,
15 correct?

16 A. That is correct.

17 Q. Okay. And in paragraph 199, you refer to a
18 pinch-off voltage.

19 What is a pinch-off voltage?

20 A. So a pinch-off voltage is used in a couple
21 different ways for JFETs. One is in, when the drain
22 becomes high enough that it can pinch off the channel
23 itself, and then also -- it's usually also often used for
24 when the gate depletion regions pinch off the channel.

25 Q. Okay. So when -- when you're using pinch-off

1 voltage here in paragraph 199, which understanding of
2 pinch-off voltage were you using?

3 A. So turns out, those two definitions overlap in
4 values, though I was using the pinch-off voltage of,
5 let's see, two volts. So that's a pinch-off voltage
6 that, I think, is listed in DeMaw.

7 Q. Okay. And that voltage is the voltage
8 between -- or the voltage differential between the gate
9 and the source, correct?

10 A. Yes, but it would be understood to be a negative
11 voltage because the pinch-off would happen when the gate
12 is high -- higher than the -- sorry.

13 In DeMaw, the gates of source voltage, the gate
14 is a ground, and the source is positive. So you have a
15 negative voltage from gate to source.

16 Q. Okay. So I believe, if I understood correctly,
17 in JFETs, generally -- aside from DeMaw, but JFETs,
18 generally, they are de faults to conductive to on; is
19 that right?

20 A. They're -- they're called depletion mode
21 devices, which means they're on and then you create a
22 depletion region to turn them off.

23 Q. Okay. And you can do that by either changing
24 the drain or the gate voltages; is that right?

25 A. I think, for the instances of what we're looking

1 at in 199, we're -- we're really looking at the -- the
2 gate-to-source voltage. So in a source voltage is more
3 positive than the gate, the depletion region will get to
4 the pinch-off. Once again, you'd have to look at the
5 specific device to see whether that leads to zero current
6 or just its lowest conduction current.

7 Q. Okay. And I think we -- we've spoken previously
8 about MOSFETs, and I believe last time you testified that
9 there's -- there's literally leakage current in a MOSFET
10 to ground, like to the Earth.

11 Is there a similar concept of leakage current in
12 JFETs?

13 A. I think, in general, devices have leakage
14 currents. It's, you know, what orders of magnitude they
15 are. Leakage currents for MOSFETs are, typically, orders
16 of magnitude smaller than the conduction currents.

17 For JFETs, I'd have to look at a specific JFET,
18 but my recollection is it's not that case where, in
19 pinch-off, they're orders of magnitude. They -- you'd
20 have to look at a specific device, but the -- some
21 current still flows. We'd have to look at what that is
22 and whether that would be considered by a POSITA to be
23 leakage. But the MOSFETs are well -- well understood in
24 that region.

25 Q. Okay. And just looking at paragraph 199 here,

1 there's a quote, I believe, from DeMaw. And at the end
2 of that quote, it uses the term $V_{gs(off)}$.

3 Do you see that?

4 A. Yes.

5 Q. What is $V_{gs(off)}$?

6 What does that mean?

7 A. So we're describing here the pinch-off voltage.
8 And so, my understanding is $V_{gs(off)}$ would be the state
9 of the FET when it has its lowest current, which, here in
10 DeMaw, they may consider to be off. But you have to look
11 at the specific transistor. But that's the region that
12 they're, I think, referring to with that V_{gs} .

13 Q. Okay. And it's saying, in that quote, Allowing
14 for the published spread of negative one to negative four
15 volts, $V_{gs(off)}$.

16 Is that V_{gs} value a range?

17 A. So in a simulation model, you would normally
18 have, for instance, a nominal value, and I don't recall
19 the literature, but I -- I believe that there can be some
20 variation in the pinch-off voltage, also, between
21 devices.

22 So I think DeMaw was just saying it's -- the --
23 the range its using is a reasonable -- reasonable range,
24 reasonable number.

25 Q. So just to make sure I understood, the -- that

1 range of negative one to negative four volts, it's your
2 opinion that that's -- that the range of pinch-off
3 voltages might reflect variation between devices; is that
4 right?

5 A. Or are within a signal device under different
6 manufacturing variations, temperature variations, et
7 cetera.

8 Q. Okay. So based on this, your reading is that
9 the pinch-off voltage should lie between negative one and
10 negative four volts based on what's being disclosed?

11 MS. LEPORE: Objection. Form.

12 THE WITNESS: So DeMaw is stating that R1 is
13 selected to give a Vgs of .8 for pinch-off voltage, which
14 would be on the order of two volts. And that allows for
15 the published spread of minus one to minus four volts.
16 So DeMaw is saying on the order of two volts is a
17 reasonable value for pinch-off voltage, and then it's
18 further saying that is within the public -- published
19 spread.

20 And certainly, two is between one and four, so I
21 think that is consistent in the sentence.

22 BY MR. MAGEE:

23 Q. Okay. If we can -- we have to go back up in
24 your report a little bit here. So I want to look -- just
25 below the section of transistors before, it's on page 25.

1 I believe we have a section on resisters.

2 A. I apologize. Paragraph numbers might help me be
3 more precise.

4 Q. Sure. Sorry. Let me be more precise.

5 Starting on paragraph 65 of your report, I
6 believe that should be on page 25.

7 A. Yes. I'm there. I'm at paragraph 65.

8 Q. Okay. So -- so paragraph 65 through 67 are the
9 technical background you're providing on resisters; is
10 that right?

11 A. Yes. General overview of resisters is in 65
12 through 67.

13 Q. Okay. And then the general overview of
14 capacitors is just below that in paragraph 68 to 74,
15 correct?

16 A. The -- paragraph 67 through 74 cover the general
17 background of capacitors in this overview section.

18 Q. Okay. And then starting in paragraph 78, that
19 should be on page 28 of your declaration, you have a
20 section on local oscillators.

21 Do you see that?

22 A. I do see paragraph 78, and it is discussing
23 local oscillators.

24 Q. Okay. You have a diagram with four different
25 types of signals that can be generated by a local

1 oscillator: A sine wave, a square wave, a pulse, and an
2 impulse.

3 Do you see what I'm referring to?

4 A. I do see the image there that has sine wave,
5 square wave, pulse, and impulse on it.

6 Q. Okay. You -- you created that image, correct?

7 A. It certainly is representative of those -- those
8 figures. This could have come from reference material in
9 my classes. So I don't know if I drew this actual one by
10 hand, but it's representative of the wave forms.

11 Q. Okay. But for your declaration, that's not
12 coming from one of the exhibits or some other source,
13 correct?

14 A. That is correct.

15 Q. Okay. And in paragraph 79, you state that the
16 diagram above shows different types of signals that can
17 be generated by a local oscillator.

18 So it's my understanding that that diagram is
19 meant to show four different LO signals; is that correct?

20 A. The diagram shows four different signals, and in
21 that particular diagram, they all have the same period,
22 and they could be used in the general concept of the
23 local oscillator. It depends upon the system that you're
24 using.

25 But those four could be used under the, you

1 know, broad term of local oscillator.

2 Q. Okay. And I think you said all four have the
3 same frequency; is that right?

4 A. In the figure that's drawn in paragraph 78,
5 yeah, it appears they all have the same frequency.

6 Q. Okay. And you discuss in paragraphs 80 -- let
7 me -- let me do this one step at a time.

8 In paragraph 80, you discuss the characteristics
9 of the sine wave, correct?

10 A. Paragraph 80 discusses the sine wave.

11 Q. Okay. And paragraph 81 discusses the
12 characteristics of the square wave; is that correct?

13 A. Paragraph 81 discusses a square wave, yes.

14 Q. Okay. And paragraph 82 discusses the pulse,
15 correct?

16 A. Paragraph 82 does describe the pulse wave form.

17 Q. Okay. I didn't see any description of the
18 impulse wave form. Was that intentional?

19 A. Impulse has a known definition. It has a very
20 strict mathematical definition, but for an engineer, an
21 impulse is a -- is a very, very short pulse often, maybe,
22 described as having a negligible width. But it would be
23 as shown in the figure.

24 Q. Is there a meaningful difference between a pulse
25 and an impulse?

1 MS. LEPORE: Objection. Form.

2 THE WITNESS: I think to derive a meaningful
3 difference, you would just need to be describing the
4 specific example to be able to answer that question, I
5 think.

6 BY MR. MAGEE:

7 Q. And -- and I -- I wasn't trying to put any magic
8 on the term meaningful.

9 In -- earlier, you said an impulse is a very,
10 very short pulse, often may be described as having a
11 negligible width.

12 Is it just that an impulse is a subset of a
13 pulse?

14 Is that accurate?

15 A. Once again, mathematics have a very specific
16 mathematical description of a pulse. Just looking in the
17 figure that is there, the impulse has two values, a low
18 value and a high value. Pulses also have that. The
19 pulse shown there has a significant width which can be
20 seen from the diagram. The impulse, once again, we'd
21 have to talk about, specifically, an application to
22 understand what meaning that impulse would have.

23 But in general, mathematically, they have the
24 zero width and, you know, from a practical standpoint,
25 they'd have a negligible width.

1 Q. Okay. And for a square wave, does that require
2 equal period of the high signal and the low signal?

3 A. Once again, I think you'd have to look at the
4 application to specify the wave form exactly. Certainly,
5 a wave form that has equal high and equal low would be a
6 square wave, but slight variations from that even
7 distribution, I don't think -- like I said, you'd have to
8 look at the specific application to understand the
9 terminology.

10 Q. Okay. But in your -- your drawing, the pulse, I
11 will characterize it, has a significant deviation from an
12 equal high and low.

13 Would that pulse, as you've drawn it, still be
14 considered a square wave?

15 A. I think, once again, you'd have to talk about a
16 specific application. Clearly in the diagram, the pulse
17 is shown with a -- what we refer to as a duty cycle much
18 less than 50 percent. So I think -- I think the -- the
19 picture speaks for itself there.

20 Q. I -- I guess my question would be, in this
21 picture, would you consider the wave labeled pulse to be
22 a square wave?

23 A. The wave form that is a pulse has similar shape
24 to the square wave. It transitions from low to high
25 abruptly. It has a high value. It transitions from high

1 to low abruptly. It just has a pulse width that's
2 clearly significantly less than 50 percent. So that's
3 really the differentiation between the diagram I've shown
4 as square wave and what I've shown as pulse.

5 Q. Is it your opinion that a square wave should
6 have a pulse width that is, approximately, 50 percent
7 duty cycle?

8 MS. LEPORE: Objection. Form.

9 THE WITNESS: Once again, need to look at a
10 specific example of the one that's drawn. In paragraph
11 78, was drawn to have, approximately, 50 percent duty
12 cycle, as you can see on the page.

13 BY MR. MAGEE:

14 Q. I guess I'm trying to get a feel for what the --
15 the boundaries of a square wave are.

16 So does a square wave include the pulse and
17 impulses drawn on page 28 of your declaration?

18 MS. LEPORE: Objection. Form.

19 THE WITNESS: A -- so the wave forms speak for
20 themselves. A POSITA would be able to look at the wave
21 forms and understand what each one means. Common
22 terminology is listed on the left. An engineer can
23 clearly look at the wave forms and say, Okay. Look, the
24 second wave form, low to high, abruptly stays high --
25 high to low abruptly, same characteristic shape for the

1 third wave form. And then they would note the second
2 wave form has, roughly, a 50 percent duty cycle; third
3 wave form has a significantly less than a 50 percent duty
4 cycle. A noticeable duty cycle, maybe it's 20 percent.
5 It would be -- I'd have to measure it to see it exactly.

6 So I think a POSITA would understand, you know,
7 the shape similarities, but then would understand the
8 pulse width is the difference between those two, and
9 you'd have to look at the application to understand, you
10 know, how those are used.

11 BY MR. MAGEE:

12 Q. So would a person of skill in the art have to
13 look at how the signals are used to understand whether or
14 not the pulse drawn here would count as a square wave?

15 MS. LEPORE: Objection. Form.

16 THE WITNESS: I think that whenever a POSITA is
17 considering wave forms, they have in their mind a context
18 in which to understand those. So I think they would
19 understand -- let me state that a different way.

20 A POSITA would understand that both the shape
21 and the duty cycle, or width, are important electrical
22 parameters. And so, they would need to understand, in
23 context, of what those parameters would need to be or
24 what those parameters are from the system or circuit
25 they're -- they're thinking about or looking at.

1 BY MR. MAGEE:

2 Q. Maybe I'm just not asking it correctly.

3 I'm -- what I'm trying to capture or understand
4 is whether a pulse is, essentially, a subset of square
5 waves.

6 A. Okay. I -- I'm not aware of the field defining
7 a -- I don't want to use a biological term -- but, sort
8 of, a family that one is a subset of the other. So I --
9 it's not a concept I'm familiar with.

10 What a POSITA would look at is, figure in 78,
11 the pulse and square wave have the similar shapes, but
12 they differ in the duty cycle. And so, they would
13 understand the shape and they would understand the duty
14 cycle. If you widen the pulse to 50 percent, they might
15 call it a pulse, they might call it the square wave.
16 They look very much the same as above. But whatever
17 terminology they use, they would understand what the wave
18 form is, its shape and its duty cycle.

19 Q. Okay. So all right. I think I've got it.

20 Looking at the figure you have in figure four,
21 essentially, a person of skill in the art would look at
22 these and recognize that, like, the sine wave and the
23 square wave both have, approximately, as drawn,
24 50 percent duty cycles, and that differs from the pulse
25 and the impulse, correct?

1 A. The duty cycle differs between the square wave,
2 the pulse, and the impulse. Yes.

3 Q. Okay. And the sine wave is, also, approximately
4 a 50 percent duty cycle; is that accurate?

5 A. I -- I would -- certainly, mathematically, it's
6 exactly 50 percent. If -- if -- I think duty cycle is a
7 little bit more well defined for wave forms that more
8 look like a pulse or a square wave. But mathematically,
9 the sine wave is high exactly 50 percent of the time and
10 it's low exactly 50 percent of the time. So I think
11 that's a more accurate way in saying a sign wave has a
12 pulse width.

13 Q. Okay.

14 A. But it's certainly a symmetric wave form.

15 Q. Okay. And as drawn, these four signals have the
16 same fundamental frequency?

17 A. That was the intent of the -- the figure. I
18 don't think it was trying to communicate any nuance of
19 difference in frequencies here.

20 Q. Okay. All right. So -- so a person of skill in
21 the art would be able to describe these -- at least the
22 square width of the pulse and the impulse in terms of
23 their duty cycle and their fundamental frequency and then
24 they might observe the differences in pulse width; is
25 that right?

1 A. You said three things. I'm sorry. I -- could
2 you just repeat the three things?

3 Q. Sure. Let me just do it more slowly.

4 A person of skill in the art would be able to
5 describe the square wave, the pulse, and the impulse
6 signals drawn here in terms of their fundamental
7 frequency and their duty cycle and their pulse width to
8 distinguish one from the other, correct?

9 MS. LEPORE: Objection. Form.

10 THE WITNESS: The square wave, the pulse, and
11 the impulse fundamental frequency, yes, they can describe
12 it with that. Duty cycle and pulse width are related.
13 So if you have a fundamental frequency and you have a
14 pulse width, you get a duty cycle. So those two in the
15 same. And then, of course, there's a shape conveyed in
16 the figure in 78.

17 BY MR. MAGEE:

18 Q. Okay. Can we switch exhibits? I want to turn
19 to the patent at issue here, the '342 patent.

20 Do you have that handy?

21 A. I do have the '342 up.

22 Q. Okay. And if you go down in the claims, they're
23 going to be in the last three pages of the document -- or
24 the last two.

25 A. I am there. I also have a printout of them

1 because I usually can't read what's in the patent. So I
2 have a blown-up version next to me.

3 Q. I am sympathetic. I will assume your printout
4 is correct.

5 Okay. So for the purposes of the IPR, we're
6 looking at the claims that depend off of claim 18,
7 correct?

8 A. 19 through 21, I think -- oh, yes. All through
9 23 that depend upon 18. Yes.

10 Q. Okay. So looking at claim 18, that's describing
11 a method for down converting electromagnetic signal,
12 correct?

13 A. That is the preamble.

14 Q. Okay. And the first step labeled one is
15 receiving an information signal.

16 Do you see that?

17 A. I see that as limitation marked one in the
18 actual patent document.

19 Q. Okay. What is an information signal?

20 A. In the context of the patent, this would be an
21 an RF signal that contains information.

22 Q. Okay. Does the information signal have to be
23 received over the air?

24 A. The method is just describing receiving an
25 information signal. An antenna, for instance, isn't

1 listed in the claim.

2 Q. I'm sorry. You said the antenna is not listed;
3 is that correct?

4 A. That's correct. It certainly could use an
5 antenna, but it's not -- it's not a word listed in the
6 claim.

7 Q. Okay. And maybe this will help a little bit.

8 If we could scroll up -- I think it's one
9 page -- to column 49 of the patent.

10 Sorry. Are you there?

11 A. Yes. I see column 49.

12 Q. Okay. Do you see the heading in column 49
13 entitled, Example method embodiment of the invention?

14 It's around line 27 or so.

15 A. I do see, Example method embodiment of the
16 invention, roughly, around line 27 or line 30.

17 Q. Okay. So if you can go down to line -- I guess
18 it's 37 -- it's the start of the paragraph starting, In
19 step 06202.

20 Do you see that?

21 A. I do see 6202.

22 Q. Okay. Just go ahead and read that paragraph and
23 let me know when you're done.

24 A. I -- I've read that paragraph.

25 Q. Okay. That -- that paragraph explains that the

1 RF information signal can be received via antenna or
2 cable, correct?

3 A. That is -- that's stated in the paragraph
4 starting with, In step 6202, in column 49.

5 Q. Okay. And you agree that claim 18 includes this
6 embodiment, correct?

7 MS. LEPORE: Objection. Form.

8 THE WITNESS: Well, claim 18 is the -- is the
9 invention, and the patent has embodiments. And those
10 embodiments -- there's many embodiments in the patent.
11 And so, the -- they support the basis for the claims. So
12 the POSITA understands how to -- what the technology is
13 and what the claims are, but I -- you know, claim 18
14 doesn't say, you know, this is the invention of figure
15 62.

16 BY MR. MAGEE:

17 Q. Okay. Figure 62 is being described as an
18 example method embodiment of the invention, though,
19 correct?

20 A. So figure 62 illustrates a flow chart of a
21 method 6200 for down converting --

22 (Reporter clarification.)

23 THE WITNESS: Sorry.

24 Figure 62 illustrates a flow chart of a method
25 6200 for down converting an electromagnetic signal

1 according to an embodiment of the present invention.

2 My understanding, the present invention is
3 speaking to the inventions as a patent, as a whole. So
4 it's an embodiment.

5 BY MR. MAGEE:

6 Q. And is it your understanding that claim 18
7 encompasses this embodiment?

8 MS. LEPORE: Objection. Form.

9 THE WITNESS: I claim 18 is what claim 18 is so
10 it has its claim elements. There's certainly some
11 similarities with the words in figure 62 that's being
12 discussed here, but the claims are the claims.

13 BY MR. MAGEE:

14 Q. Are you interpreting claim 18 to exclude this
15 embodiment?

16 MS. LEPORE: Objection. Form.

17 THE WITNESS: Just for clarity, if you could
18 just repeat your question?

19 BY MR. MAGEE:

20 Q. Sure.

21 Are you interpreting claim 18 to exclude the
22 embodiment described in figure 62?

23 MS. LEPORE: Objection. Form.

24 THE WITNESS: So once again, claim 18 is the
25 invention. Certainly, the description's in figure 62,

1 and I think it also refers to 160, for example. Those
2 are embodiments that would allow a POSITA to understand
3 what the invention is and be able to practice the
4 invention. So that's how I understand claim 18.

5 BY MR. MAGEE:

6 Q. Is it possible --

7 A. I just -- sorry. I just want to clarify.

8 When I say the invention, I mean it in the terms
9 of the patent. I apologize.

10 Q. Sure.

11 Is it possible for you to view side-by-side
12 figure 62 of the patent and claim 18 of the patent?

13 A. That is possible. Yes.

14 Q. Okay. If you could maybe arrange your windows
15 to do that and just let me know when you're ready.

16 A. Yeah. Just for clarity, I have the claims
17 printed out, and I have figure 62 in front of me.

18 Q. Okay. So the preamble to claim 18 is a method
19 for down converting an electromagnetic signal, correct?

20 A. Claim 18, a method for down converting an
21 electromagnetic signal, comprising the steps of.

22 Q. Okay. And the first box in figure 62 is, Method
23 for down converting an electromagnetic signal, correct?

24 A. That's correct.

25 Q. Okay. And step one of claim 18 is, Receiving an

1 information signal, correct?

2 A. Step one is receiving an information signal.

3 Q. Okay. And 6202 in figure 62 is receive an RF
4 information signal, correct?

5 A. That's what's written in 6202.

6 Q. Okay. Do you believe there's a difference
7 between an information signal and an RF information
8 signal?

9 MS. LEPORE: Objection. Form.

10 THE WITNESS: I think that a POSITA, for
11 instance, would understand RF, generally, as a received
12 signal from an antenna, but you can receive an
13 information signal on a cable, and that would be an
14 information signal that may have a modulation carrier
15 that's in it.

16 BY MR. MAGEE:

17 Q. Okay. And claim 18, because it uses the term
18 information signal, encompasses your situation described
19 as where you receive an information signal on a cable
20 that may have a modulation carrier in it, correct?

21 A. To be clear, claim 18 describes down conversion
22 of an information signal. So you -- you'd have to have
23 some signal with that information to do the down
24 conversion of the signal, but it's -- does not specify
25 what type of signal it's receiving.

1 Q. Okay. And step three of claim 18 is,
2 Electrically coupling the information signal to a first
3 capacitor and the inverted information signal to a second
4 capacitor, correct?

5 A. That is the -- the labeled third step in claim
6 18.

7 Q. Okay. And step 6204 figure 62 is, Electrically
8 couple the RF information signal to a capacitor, correct?

9 A. That's what 6204 says.

10 Q. Okay. Are -- are you interpreting any
11 difference between electrically coupling the information
12 signal to a first capacitor and electrically couple the
13 RF information signal to a capacitor?

14 MS. LEPORE: Objection. Form.

15 THE WITNESS: I read the third step in claim 18
16 as, Electrically coupling information signal to a first
17 capacitor and the inverted information signal to a second
18 capacitor. So that's the claim.

19 6204, as you read it, has the same words --
20 that's not correct.

21 It has some of the same words, but the claim
22 element has a first capacitor, second capacitor,
23 references information. And 6204 doesn't describe the
24 first and the second, and it refers to it as RF
25 information.

1 So there's differences, but you know, they have
2 similar words.

3 BY MR. MAGEE:

4 Q. Okay. Are you reading electrically coupling in
5 paragraph 18 to be different than electrically couple in
6 figure 62?

7 MS. LEPORE: Objection. Form.

8 THE WITNESS: I think there's two pieces to
9 that. I think the first one is, electrically coupling is
10 a construed term. So I would, you know, interpret that
11 as the claim construction is indirectly or directly
12 connecting such that the electrical signal can flow
13 between. That's the first -- that's how I understand
14 that. Coupling, I think you were saying, is electrically
15 couple different than electrically coupling. The -- I'm
16 not an English major. The difference between couple and
17 coupling, I think -- I don't see a specific difference.
18 It's just how the grammar is in the different writing of
19 the two pieces.

20 BY MR. MAGEE:

21 Q. Okay. In step four of claim 18 is, Controlling
22 a charging and discharging cycle of the first and second
23 capacitors with first and second switching devices
24 electrically coupled to the first and second capacitors,
25 respectively.

1 Do you see that?

2 A. I'm in step four in claim 18.

3 Q. Okay. And step 6206 of figure 62 is, Control a
4 charging and discharging cycle of the capacitor with a
5 switching device electrically coupled to the capacitor.

6 Do you see that?

7 A. I do see 6206.

8 Q. Okay. Do you interpret controlling a charging
9 and discharging cycle of the first capacitor to be
10 different than controlling a charging or discharging
11 cycle of the capacitor?

12 MS. LEPORE: Objection. Form.

13 THE WITNESS: Once again, I look at 18.4 and its
14 controlling the charging and discharging of two
15 capacitors, a first capacitor and a second capacitor. It
16 also has a first and a second switching devices coupled
17 to the capacitors.

18 6206 is not -- does not reference the first and
19 a second switch or a first or a second capacitor.

20 BY MR. MAGEE:

21 Q. Do you -- are you interpreting the step of
22 controlling a charging and discharging cycle differently?

23 MS. LEPORE: Objection. Form.

24 THE WITNESS: I believe controlling a charging
25 and discharging cycle is, once again, a term I outlined

1 in my claim construction section. I would not apply
2 different construction to 6206 for controlling a charging
3 and discharging cycle than I would to claim 18.4.

4 BY MR. MAGEE:

5 Q. Okay. Step five of claim 18 is, Performing a
6 plurality of charging and discharging cycles of the first
7 and second capacitors to generate first and second down
8 converted information signals across first and second
9 impedance devices, respectively.

10 Do you see that?

11 A. I do see that as step five in claim 18.

12 Q. Okay. And step 6208 of figure 62 is, Perform a
13 plurality of charging and discharging cycles of the
14 capacitor, thereby forming a down-converted information
15 signal.

16 Do you see that?

17 A. I do see 6208, yes.

18 Q. Okay. Is your understanding, Perform -- strike
19 that.

20 Are you interpreting, Performing a plurality of
21 charging and discharging cycles of the first capacitor
22 different from perform a plurality of charging and
23 discharging cycles of the capacitor?

24 MS. LEPORE: Objection. Form.

25 THE WITNESS: So I look at claim 18 step five.

1 I look at the whole limitation, Performing a plurality of
2 charging and discharging cycles of the first and second
3 capacitor to generate a first and second down-converted
4 information signals across a first and second impedance
5 devices.

6 So step five has all the words I just read. I
7 think your question might be, am I interpreting
8 performing a plurality of charging and discharging
9 cycles, those words, would, I think, have a different
10 meaning in the claim than they do in 6208, I don't think
11 they -- they would. I'd interpret it with the same
12 construction I put my construction section for charging
13 and discharging cycles.

14 BY MR. MAGEE:

15 Q. Okay. And I know it's a little hard to keep all
16 these parts together, but in column 49 of the '342
17 patent, it states that method 6200 is described with
18 reference to the embodiment illustrated in figure 160,
19 correct?

20 A. Yes. That is -- yeah, 160. Not 160.

21 Q. Yes. 16 and the letter 0.

22 A. Yes.

23 Q. If we could look at figure 160 --

24 MS. LEPORE: Counsel, we're coming up on an
25 hour. Is now a good time to take a break?

1 MR. MAGEE: Sure. We can take a break here.
2 I'm assuming we're off the record.

3 (A recess was held from 10:09 a.m. to 10:23 a.m.)

4 MR. MAGEE: On the record.

5 MS. LEPORE: We're on the record again.

6 MR. MAGEE: Yeah. They don't have a signing on
7 and off like they do with the video.

8 BY MR. MAGEE:

9 Q. Okay. Dr. Ricketts, did you talk to anyone
10 during your break?

11 A. I had a quick call with Taylo -- Taylor --
12 sorry -- just to check on logistics and timing of taking
13 the breaks.

14 Q. Okay. And you didn't discuss the substance of
15 your testimony?

16 A. No.

17 Q. Is that right?

18 A. That's correct.

19 Q. Okay. Turning back to the '342 patent, claim
20 18, is that covering an energy transfer system or method
21 of down converting electromagnetic signal using an energy
22 transfer system?

23 MS. LEPORE: Objection. Form.

24 THE WITNESS: I believe in my declaration in
25 section 10C, starting on paragraph 171, I address that

1 claims 19 through 21 are directed to an energy transfer
2 system, and I give my explanation below in that section.

3 BY MR. MAGEE:

4 Q. Okay. And I think we were going to turn to
5 figure 160 of the '342 patent. Let me know when you're
6 there.

7 A. I am at figure 160.

8 Q. Okay. On the left side of the figure 160,
9 there's a node labeled 1642, and it's also labeled
10 carrier (plus).

11 Do you see that?

12 A. I do see 1642.

13 Q. Okay. Is that the RF information signal?

14 MS. LEPORE: Objection. Form.

15 THE WITNESS: I think the patent describes in
16 160, the R0 signal is electrically coupled to the carrier
17 (plus) port of the receiver 1602, and I think you've
18 identified the plus as terminal 1642. And it says
19 carrier (plus).

20 BY MR. MAGEE:

21 Q. Okay. And the -- the RF signal electrically
22 coupled to the carrier (plus) port of receiver 1602, is
23 it your understanding that that's the RF information
24 signal?

25 MS. LEPORE: Objection. Form.

1 THE WITNESS: I think a POSITA would understand
2 a carrier is a carrier signal that carries an information
3 signal. That's what it would do.

4 BY MR. MAGEE:

5 Q. Okay. And the inverted RF information signal is
6 coupled to the carrier (minus) port labeled 1644; is that
7 right?

8 A. So the patent describes for receiver 1602,
9 received RF signal is inverted, for example, using an
10 inverter shown in figure 17. And the inverted RF signal
11 is coupled to the carrier port (minus) -- carrier
12 negative the port. And figure 160 node 1644 is the
13 carrier (minus). So I think that refers to that node.
14 And then of course, figure 17 describes, you know, common
15 signal ended balanced conversion using a balance, for
16 instance, for RF and carrier signals.

17 Q. Okay. And the inverted RF signal coupled to the
18 carrier negative port, that's the inverted RF information
19 signal, correct?

20 MS. LEPORE: Objection. Form.

21 THE WITNESS: The received RF signal is
22 inverted, and the inverted RF signal is coupled to
23 carrier (minus) port which is labeled 1644 in figure 160.

24 BY MR. MAGEE:

25 Q. Do you understand that to be the inverted RF

1 information signal or a different signal?

2 MS. LEPORE: Objection. Form.

3 THE WITNESS: I think the specification
4 describes the RF signal as inverted, and we described the
5 carrier would be carrier containing the information. So
6 I -- I -- I think, yes, I would understand carrier
7 (minus), as described for the figure 160, to be the
8 inverted -- I'm sorry -- the inverted carrier R
9 information signal. And you know, as explained, for
10 instance, by figure 17, which shows you going from a
11 single into a differential wave form to create a plus and
12 a minus.

13 BY MR. MAGEE:

14 Q. Okay. And 1608 in figure 160, that is the
15 switching device coupled to the first information signal,
16 correct -- or the RF information signal, correct?

17 A. The switching device electrically coupled to the
18 capacitor is used to control the charging and discharging
19 cycle of the capacitor. 1608 would be the switching
20 device that would allow the coupling of information onto
21 the storage capacitor.

22 Q. Okay. And as illustrated in figure 160, switch
23 1608 is located between the bias node and one of the
24 terminals of the capacitor, correct?

25 A. Yes. The switch 1608 is between bias, which

1 would be a virtual ground for the differential system,
2 and the capacitor 1604.

3 Q. Okay. And 1620 is the impedance device coupled
4 to the first capacitor, corrects?

5 A. The specification describes, in figure 160, the
6 carrier signal writing on the down converted signal is
7 removed using the amplifier 1620 and 1624. That's the
8 functional description that the specification has for
9 1620.

10 Q. Okay. And claim 18 requires performing a
11 plurality of charging and discharging cycles of the first
12 and second capacitors to generate first and second
13 down-converted information signals across first and
14 second impedance devices, respectively, correct?

15 MS. LEPORE: Objection. Form.

16 THE WITNESS: Yes. I believe that's a correct
17 reading of that limitation.

18 BY MR. MAGEE:

19 Q. Okay. So is 1620 the first impedance device
20 described in claim 18?

21 MS. LEPORE: Objection. Form.

22 THE WITNESS: So in figure 160, the filter is
23 drawn as an input resistance. So it would have a -- it
24 would be an impedance on that node.

25 //

1 BY MR. MAGEE:

2 Q. And just to be clear, we're talking about the
3 node that's sent to the negative terminal of the
4 amplifier shown in 160; is that right?

5 A. Understand for clarity, so in the upper right,
6 there's an amplifier triangle with a minus sign. And
7 between the capacitor 1604 and the negative input to the
8 amplifier, there's a resistor that's not labeled. But
9 yes, that resistor would be an impedance on the output of
10 the switch in the capacitor.

11 Q. Okay. That node that we were just talking
12 about, is that a high PS node or a low PS node?

13 A. In the context of claims 19 where we're talking
14 about significant discharge, that would have to be a low
15 impedance load, if -- if that was a load, in -- in that
16 the patent specification doesn't describe those resistor
17 values. It just describes it as a filter.

18 Q. Okay. But in the context of claims 19, that
19 would have to be a low impedance load; is that correct?

20 A. Claims 19 and further describe charges, for
21 instance, between 6 and 50 percent, and you would need a
22 low impedance load to -- to do such a discharge. A
23 POSITA would understand that.

24 Q. Okay. And going back to column 49, in the
25 section starting on line 30 describing figure 62 and

1 figure 160, are you there?

2 A. Yeah -- yes, column 49.

3 Q. Okay. Starting around line 39, there's a
4 sentence that starts, In embodiments, the RF signal may
5 be amplified using a low noise amplifier and/or filtered
6 after it is received.

7 Do you see that?

8 A. I do see that sentence.

9 Q. Okay. The low noise amplifier and/or optional
10 filters are not illustrated in fixture -- figure 160,
11 correct?

12 A. They are not illustrated in figure 160.

13 Q. Okay. In the embodiments where there would be a
14 noise amplifier or filter, that would be before the RF
15 information signal is received at carrier (plus) or
16 carrier (minus) in figure 160, correct?

17 MS. LEPORE: Objection. Form.

18 THE WITNESS: I'm sorry. Is there a specific
19 figure you're referring to? Because we just discussed it
20 wasn't in 160.

21 BY MR. MAGEE:

22 Q. Yeah. Let me -- let me re-ask my question.
23 Perhaps it was confusing.

24 In the embodiment where the RF information
25 signal is amplified with a low noise amplifier or

1 filtered with a filter, those components would be before
2 the RF information signal is received at carrier (plus)
3 in figure 160, correct?

4 MS. LEPORE: Objection. Form.

5 THE WITNESS: So I think we're not talking about
6 a specific embodiment or figure in the patent, but in
7 general, in an RF system, you have an antenna, and the
8 antenna can have filtering, and it can have
9 amplification. And then you get an RF information signal
10 out of those, and then, typically, in the systems they go
11 to mixers down conversion after that.

12 BY MR. MAGEE:

13 Q. Okay. And what we're looking in figure 160,
14 that's the -- in box 1602, that's the mixer you were just
15 referring to, correct?

16 A. The -- I believe the patent uses a more precise
17 term. So I should -- I should refer to that. Just a
18 moment. I believe the patent refers to, in general,
19 1662 -- 1602 as a receiver. And you know, from the many
20 embodiments here, we would understand that this switching
21 is creating a down-converted signal. So it is receiving
22 that -- I used the word mixer. I'm just corrected to
23 it's a receiver, as described in the specification, but
24 it creates a down-converted version of the signal.

25 Q. Okay. So as you described it, in general, in an

1 RF signal, you can have an antenna, and the antenna can
2 have filtering and it can have amplification, and then
3 you get an RF information signal out of those. And then,
4 typically, in the systems, they go to mixers for down
5 conversion after that.

6 Would it -- that also apply to the receiver
7 1602?

8 MS. LEPORE: Objection. Form.

9 THE WITNESS: So maybe just to restate for
10 clarity, an antenna, could have some filtering after the
11 antenna, could have an amplifier. After that, it -- we
12 have an RF information signal that could pass through a
13 cable, any kind of interconnect, and then it would get to
14 a receiver. And one of the functions of the receiver is
15 to down convert the signal, and 1602 is a down-converting
16 signal -- I'm sorry -- is a receiver, and one of the
17 functions of the receiver is to down convert.

18 BY MR. MAGEE:

19 Q. Okay. Got it. Why don't we put this aside for
20 the moment and turn back to your declaration, if that's
21 okay.

22 A. I'm back to Exhibit 2021, my declaration.

23 Q. Okay. I want to go down quite a bit to page
24 139, and -- and more specifically, paragraph 418.

25 A. I am at paragraph 418.

1 Q. Okay. And I believe, in this section, we're
2 generally talking about the simulation of the circuits in
3 DeMaw, and I believe figure 1 referenced in paragraph 418
4 are -- is your figure of simulations performed on the
5 circuits of DeMaw; is that correct?

6 A. The -- in paragraph 418, the reference figure 1
7 (below) refers to the figure just below it, and it has a
8 caption, Figure 1, voltage across C4 and C5.

9 Q. Okay. And figure 1 is simulation results that
10 you generated, correct?

11 A. They are Dr. Galton's simulation files. So I
12 took his files as he delivered them and I hit run, and
13 this is data from that run of his files.

14 Q. Okay. And just to be a little bit more precise,
15 the visualization of this data is something that you
16 performed, correct?

17 A. The plotting of this is -- I believe this was
18 done in Excel. So I ran the simulation, got the data,
19 exported the data in a format that Excel could read, and
20 then plotted the data to show a full cycle of a modulated
21 IF signal.

22 Q. Okay. What is a full cycle of a modulated IF
23 signal?

24 A. So we have a carrier, and then we have a
25 modulation. And so, that modulation is a slowly varying

1 information signal, if you will, on that carrier. And in
2 the simulation, you could see the information signal was
3 varying with a period much wider than the RF. And so, I
4 looked to take one whole section of that variation, and
5 that's what I plotted in -- at the bottom of figure --
6 I'm sorry -- at the bottom of 418 -- the figure --
7 paragraph 418.

8 Q. Okay. And it looks like, in these figures --
9 actually, let me ask it differently.

10 The X axis in these figures is time, correct?

11 A. That is correct.

12 Q. Okay. What is the Y axis in these figures?

13 A. That would be voltage on the capacitor.

14 Q. Okay. And the -- and the units are in volts?

15 A. That is correct.

16 Q. Okay. So if I'm reading these figures
17 correctly, the range of values ranges from,
18 approximately, 10.25 volts to, approximately, 13.5 volts;
19 is that right?

20 A. So my appendix has the actual data ranges for
21 quite a few runs, but specifically to the image that
22 we're looking at, looking at the voltage on C4, I think
23 what you said is, approximately, correct. I -- I -- it's
24 approximately 10.25 to 13.5.

25 Q. Okay. And it's centered around 12 volts; is

1 that right?

2 A. That is correct. That's the value that is in
3 Dr. Galton's simulation.

4 Q. Okay. And that's the bias voltage; is that
5 right?

6 A. So this is a capacitor in RF output systems. So
7 I don't -- I don't know that I would call that a bias.
8 Usually we call bias for devices, but I -- I think you
9 could say 12 volts is the average voltage, and it's set
10 by, I believe, in Galton simulation, a voltage source
11 somewhere that -- let me just -- let me just be more
12 specific.

13 Q. Sure.

14 A. So there's a voltage supply, V supply, in
15 Dr. Galton's simulation, and that is going to set the
16 average value on C4 and C5.

17 Q. Okay. Okay. So there's a voltage supply in
18 Dr. Galton's simulation that sets the average value on
19 the capacitors to 12 volts and then it varies around that
20 average; is that right?

21 A. The supply voltage 12 is there, and you can see
22 from the data that it is averaged around that -- averaged
23 around 12 volts.

24 Q. Okay. But it's -- you -- the data you've shown
25 here in figure 1, that's just a subset of the complete

1 data, correct?

2 A. It is the complete data over a cycle of the
3 modulation. So when you view this, you'll see this
4 repeated many times. So this is meant to show the
5 section that's repeated many times so that we're
6 capturing, if you will, all the variations in this
7 cycle -- in this modulation -- information modulation
8 cycle.

9 Q. So let me -- let me re-ask it because I think I
10 was imprecise.

11 What you've shown here is the complete set of
12 data for a subset of the total time that the simulation
13 runs, correct?

14 A. The plot here --

15 MS. LEPORE: Objection. Form.

16 THE WITNESS: The plot here shows, it looks
17 like, from 200 to 201 microseconds. So that's that
18 portion of time. And that would be a subset of time of
19 the simulation.

20 BY MR. MAGEE:

21 Q. Okay. At any point in the total simulation,
22 does the voltage vary outside of this range?

23 For instance, does it go all the way down to
24 zero volts, or does it go up to 24 volts or anything like
25 that?

1 A. So if we look at -- I'll just reference you -- I
2 think you realize it's there.

3 In appendix B -- so first off, that paragraph we
4 were just referring to, which I believe is - is it 144?

5 Q. Yes.

6 A. 418.

7 Q. 418. Got it.

8 A. In 418, that's a data where I'm showing a time
9 range. And then in 419, I show a zoom in so that you can
10 see what the wave form looks like and how you can
11 calculate percentages. So that's just the data that's in
12 that time range. And then in appendix B, I have a full
13 list of simulations over a much broader simulation time
14 there for all of the different cases.

15 Q. Okay. So appendix B -- the data in appendix B
16 is greater than what is illustrated in figure 418; is
17 that right?

18 A. I'd have to -- I'd have to check the data file
19 to see exactly the number of points, but if we -- you
20 know, if I just look at, for instance, the first -- the
21 first on page --- I think it's 182, the time starts at
22 ten microseconds, and it goes to -- I think this would be
23 20 microseconds. So that would be approximately 20 --
24 let me go back -- yes. Took me about twice as long.

25 So figure below 418 is, approximately, let's

1 see, two times five, minus six -- I think that's one
2 microsecond. I'd have to -- I think I have 200
3 microseconds to 201 microseconds. So the data in the
4 appendix is -- is longer.

5 Q. Okay. Now I feel like I might have been
6 imprecise in this. I understand that appendix B has
7 the -- actually, let me rephrase this.

8 Is appendix B the complete set of results from
9 Dr. Galton's simulations?

10 A. I think I'd have to be a little bit more precise
11 in that you can run a simulation forever, for as long as
12 you want, for hours, and this simulation only runs for as
13 long as the data points that are listed there.

14 So you could run the simulation longer, and
15 these data points are just those of the simulation period
16 that capture the data for, but they -- they cover many
17 cycles of that information signal.

18 Q. Okay. And I think you said earlier that the
19 data goes for, approximately, 20 microseconds.

20 And what's graphed in paragraph 14 is,
21 approximately, one microsecond; is that right?

22 A. The -- yes. The time scale in 418 starts at 200
23 microseconds and ends at 201 microseconds, if I read that
24 correctly. And then appendix 35, by way of example, just
25 the first one starts at 10 microseconds and runs to

1 approximately -- looks like that might be -- I just want
2 to get it correctly -- I think it might be 12
3 microseconds, 11.99, I think, is the last data point in
4 appendix B labeled fig 5_revise_DeMaw.

5 Q. Okay. So paragraph 418 starts at 200
6 microseconds and ends at 201 microseconds. So it's,
7 approximately, one microsecond.

8 And then appendix B starts at 10 microseconds
9 and ends at 12 microseconds; is that right?

10 A. Just a moment. So figure 2, after paragraph
11 419, has a zoom in so you can see the timing a little
12 better where you can see the actual RF clock and you can
13 see the clock in the wave form on there.

14 But I think your question was on appendix B.
15 The first table starts at 10 microseconds. That's
16 correct. And then it ends at 11.9 microseconds at the
17 end of the table, which would be on page 184.

18 Q. So that's, approximately, 1.9 microseconds
19 across that table; is that correct?

20 A. That would be 1.9 microseconds. That's correct.
21 And that's to capture one cycle of the modulated signal.

22 Q. So sorry. I just want to be clear. I think you
23 said earlier that figure 418 covers one full cycle of the
24 modulated signal?

25 A. Yep. Thank you. That -- that was incorrect.

1 It was to capture additional data. So it captures 2
2 microseconds, as opposed to the first one that's just one
3 microsecond, so that we'd have a second cycle to look at.

4 Q. Okay. Why did you capture this second cycle?

5 A. In a perfect world, I could have run the
6 simulation forever and captured millions or billions of
7 points. As you can see from appendix B, I did
8 calculations for all the simulations listed. And so,
9 this is just a simulation practicality of getting the
10 data in and taking the measurements. And so, I felt like
11 covering the site -- covering the information cycles
12 would cover the -- the -- if you will, the signals, both
13 the RF and the information that rides on the RF over, at
14 least -- in this example, it looks like two cycles of
15 that.

16 Q. How long did it take to run this simulation to
17 cover two cycles?

18 A. I don't recall. You do have to run it, export
19 it, and then the methodology that I used is shown in
20 paragraph 419. So I wanted to have something that was
21 clearly able to see the methodology. So I captured it
22 into Excel, and then -- sorry. Took the data. I found
23 the points using a mat lab script, and then I plotted it
24 to show this and then also calculate the rise and fall
25 times in mat lab.

1 Q. Going back down to appendix B, why does the time
2 start at 10 microseconds as opposed to 0?

3 A. Well, this is a, you know, full transistor level
4 simulation. So you know, everything starts off, and then
5 circuits wake up. And so, I picked a period that -- when
6 it was operating in its normal operation, which would be
7 after a wake-up period.

8 Q. Okay. So this was intended to capture the
9 normal operation period, not, sort of, the transient
10 wake-up period; is that right?

11 A. Yeah. Any circuit is going to have some
12 practicality when it starts up. It's not -- not the
13 intended operation. I think maybe that's a better way to
14 say it is -- when circuits start up, they're not
15 operating as intended. And at 10 microseconds, a POSITA
16 would understand, Okay, the circuit is now operating
17 as -- as its intended to operate, and that's where I
18 analyzed it.

19 Q. Okay. And I'm just looking -- I'm on page 186.
20 I'm just looking at one of the tables.

21 What is, Percentage cap one?

22 A. Okay. Just a moment. So in paragraph 408 and
23 409, I describe percent discharge as the charge discharge
24 during the period the switch is open divided by the total
25 charge stored at the beginning of the discharge period.

1 So that would be percent charge of the total charge. And
2 Q equals CV, and you can go through some of the math,
3 which you, basically, can rate this percent discharge in
4 terms of the voltages. And if you could just refer me to
5 page before just so I could go --

6 Q. I'm just on the page 186, the table along page
7 186.

8 A. Sure. Yeah. And so, there's two capacitors in
9 DeMaw. I think, perhaps, if that causes any confusion,
10 there's only two capacitors we're discussing in DeMaw.

11 Q. Understood.

12 A. I call them cap one and cap two. And so, what I
13 do is I look at the discharge values when the switch is
14 off. And so, that's when the LO is high. That was the
15 same methodology that -- let me restate that.

16 Dr. Galton said the switch is off when the LO is
17 high. I disagree with that for the reasons that are in
18 my report, but using the methodology that he had of,
19 Okay, it's proper to measure when the LO is high, I then
20 measured the capacitor voltages. And so, I looked at the
21 difference of the capacitor voltages while -- while the
22 LO was high, and then I calculated the percent change.
23 And so, a negative was a discharge and a positive was a
24 charge, and I explained in my report why these capacitors
25 could have a charge -- a positive percent change due to

1 the output filter on -- that DeMaw uses.

2 Q. Okay. And so, just to stay on page 186 for a
3 moment, I believe the very first line percentage cap one
4 is 6.4481. I know it's a little small.

5 A. That is the number that's there.

6 Q. Okay. And that indicates that it charged
7 6.4481 percent; is that right?

8 A. Those -- those columns are intended to be in
9 percent. Yes.

10 Q. Okay. And if we just look down one, two,
11 three -- ten rows, percentage cap one is negative 0.26 --
12 I got to scroll down. Sorry.

13 If we go down ten rows, percentage cap one is
14 negative 0.26328, correct?

15 A. I -- I do see that number value, approximately,
16 ten rows down. I'm sure you're correct. I didn't count.

17 Q. Okay. And just that value is indicating that it
18 discharged .26328 percent, correct?

19 A. Once again, the columns are in percent, and a
20 negative means discharge.

21 Q. Okay. How did you originally choose 1.9
22 microseconds as the amount of time to run the simulation?

23 MS. LEPORE: Objection. Form.

24 THE WITNESS: To be clear, it's 1.9999. So I
25 believe I chose 2 microseconds. It's just -- the point

1 before it repeats is -- is 1.99. So we'll say 2
2 microseconds for the charts that we've been looking at in
3 the appendix.

4 Well, in 418, I plotted -- I looked at the
5 signal and I looked at the variation of the modulation of
6 the carrier, and I saw that the modulation was over a
7 microsecond. It would repeat after that. And so, I
8 chose twice that for, you know, a practicality of
9 gathering data for what would be dozens of simulations
10 and then analyzing those. So that's -- that's how I came
11 to the 2 microseconds. So I'd have two of the repeating
12 cycles of the information signal shown in 418.

13 BY MR. MAGEE:

14 Q. Okay. And you had to run the simulation in
15 order to generate the figure in 418, correct?

16 A. The figure in 418 is from the -- is from the
17 data exported from the simulator. So yes, you'd have to
18 run the simulation and then you'd export the data and
19 then you'd analyze the data.

20 Q. Okay. So you -- you ran the simulation, export
21 the data, analyze the data, and then determine that a
22 full cycle of modulated IF signal is, approximately, 1
23 microsecond, correct?

24 A. I -- I don't think, as you stated that, it's
25 correct. In the simulator, I viewed the wave form, and

1 then I saw where one -- one information cycle was. And
2 then I said, Okay. That's a microsecond. And then I
3 exported data for all of the others and I exported two of
4 those cycles or 2 microseconds. So the -- the
5 identification of this modulation of the carrier was done
6 in this simulation, and then I just exported data for
7 that for the points that I analyzed.

8 Q. So how long did you run this simulator for when
9 you first viewed the wave form?

10 MS. LEPORE: Objection. Form.

11 THE WITNESS: I viewed -- I -- I ran the
12 simulator so that I was -- could see from the results
13 well past the start-up period of the circuit when it
14 starts at zero and I could see the information signal
15 had -- basically, the circuit was operating as it's
16 intended, and that would have been well beyond the time
17 shown here. I don't recall the exact time, but I do
18 recall that, you know, the period continued on and that's
19 how I could determine that it was operating in its
20 intended mode because the wave forms were not changing.

21 BY MR. MAGEE:

22 Q. Okay. And then based on that, you chose the two
23 microsecond simulation time for the results, that's
24 correct?

25 A. Based on that simulation, I identified the

1 repeating pattern. And from that, I said, the one I've
2 shown here is 1 microsecond, and I collected twice as
3 many. So I get two of those cycles at 2 microseconds.

4 Q. If you had already identified that the cycle
5 would repeat at 1 microsecond, why bother with 2
6 microseconds?

7 MS. LEPORE: Objection to form.

8 THE WITNESS: It's just to capture more -- more
9 data, but there's a limit on how much more data you
10 can -- you can capture. And so, you know, I could have
11 ran it for a millisecond and captured all the data. So I
12 chose a representative time that maps the cycles of the
13 information signal, and that's where I got 2
14 microseconds.

15 BY MR. MAGEE:

16 Q. But in general, you'd want to capture more data
17 within the reasonable limits on the amount of time to run
18 the simulation, correct?

19 MS. LEPORE: Objection. Form.

20 THE WITNESS: Once again, the -- the signal was
21 repeating. So I wanted to capture two cycles to show
22 what was going on in those two cycles. Those two cycles
23 repeat. I could have captured more data, but like I
24 said, there's -- you know, you could spend your -- a very
25 long time doing simulations. So I looked for one that

1 would represent the normal operation of the circuit,
2 identified a cycle in 418, and then I said, Okay, I'm
3 going to take over two of those cycles, and that's what I
4 took for each simulation.

5 BY MR. MAGEE:

6 Q. Did you ever capture more than two cycles, for
7 example, three or four?

8 A. I think to be precise on the word capture, I
9 think the simulator has a binary file it stores its data
10 in. When you export, you can export just the number of
11 points that you want. So that's what I exported.

12 Q. Okay. Did you ever export more than two cycles?

13 A. I don't recall ever exporting more than two
14 cycles.

15 Q. Okay. So you didn't check the data for more
16 than two cycles to make sure that it repeats, correct?

17 MS. LEPORE: Objection. Form.

18 THE WITNESS: I did check in that I evaluated
19 the simulations as -- when it was operating as it's
20 intended to operate and I checked for the two cycles -- I
21 checked -- I checked the simulation results for multiple
22 cycles and the simulator. I then exported just two
23 cycles.

24 BY MR. MAGEE:

25 Q. What sort of evaluation did you perform on the

1 simulations when it was operating?

2 MS. LEPORE: Objection. Form.

3 THE WITNESS: Well, I plotted the voltage on the
4 capacitors. So that's one thing I did. In, I believe,
5 other parts of my declaration, and I show plots of the
6 operation. So I checked the voltages and currents, make
7 sure they all look like I would expect them to, the
8 simulation is working correctly. And I think -- you
9 know, that's step one. When you start up simulation,
10 make sure the simulation is working as you think it
11 should. Check currents and voltages and nodes. And I
12 would do that almost every time I simulated. In fact,
13 I'd say every time I simulated. But here, I would just
14 export the data from these two nodes.

15 BY MR. MAGEE:

16 Q. How did you choose the two nodes?

17 A. I believe Dr. Galton identified C4 and C5. This
18 is with reference to his DeMaw in fig one. And so, he
19 identified these as a first capacitor and a second
20 capacitor. And so, that's why I captured the voltages on
21 those two capacitors because those are the two he
22 identified as the capacitors that were discharging.

23 Q. I see. I'm sorry. I think I misunderstood.

24 A. Sorry.

25 Q. No. It's okay. That makes sense.

1 I guess my question is slightly different -- or
2 my question is different.

3 How did you determine what start time to export
4 the data for?

5 Like why is it 10, I think it was microseconds,
6 as opposed to 20 or 18 or 5?

7 A. We, I think, discussed previously, when circuits
8 start up the node voltages aren't where they're intended
9 to be -- so there's a startup/wake-up time -- and so, I
10 looked for when that wake-up time ended, and then I saw
11 the repeating pattern. And then -- so that's when I
12 captured the data was when it was operating as intended.
13 And your question may -- may be, Well, how do you know
14 you captured the exact full cycle. That's one of the
15 reasons why I wanted to do 2 microseconds. That way
16 there was no discussion of, Did I start a few
17 microseconds too soon or too late because I would have
18 captured it all over the two cycles.

19 Q. What the significance in capturing the full
20 cycle?

21 MS. LEPORE: Objection. Form.

22 THE WITNESS: The purpose was to show the states
23 of charge and discharge. And so, the simulation is
24 periodic. And so, we've got, you know, some RF carrier;
25 some LO carriers; we've got, as a result, information

1 signals. So we wanted to capture all of the behavior of
2 those signals. And so, that's why I looked for, if you
3 will, the lowest frequency of the repeating information.
4 And that's why I looked at 418, for example -- what's
5 plotted in 418 paragraph.

6 BY MR. MAGEE:

7 Q. Okay. I think you said, earlier, that, in your
8 declaration, you have plots of the simulator as it was
9 operating; is that correct?

10 A. I have to read back the exact words, but in my
11 declaration, I have simulation results. I believe I
12 state in my declaration that I reran the simulations.
13 Dr. Galton provides lots of simulation results. And so,
14 I can -- you know, I looked at those simulation results.
15 I looked at my simulation results to see that I was
16 getting what Dr. Galton was seeing.

17 Q. Let me ask it a different way because, perhaps,
18 I misunderstood.

19 As I understood what you testified earlier, you
20 ran the simulator, and you plotted the voltage and
21 current in the simulator to observe that it was behaving
22 as intended and then you later exported a subset of those
23 results to analyze; is that accurate?

24 A. I simulated it, checked it. What did I check it
25 against? Dr. Galton provided many, many simulation

1 results to say, This is how it should operate. He -- his
2 circuit. I verified that, yeah, it's operating the
3 way -- his results in the wave forms, and then I exported
4 the data for the time period we discussed and then
5 analyzed that.

6 Q. Okay. And in your declaration, did you only
7 provide the analysis for the data you exported?

8 MS. LEPORE: Objection. Form.

9 THE WITNESS: I'm not sure I can answer that
10 question. Appendix B provides the data I've exported and
11 analyzed. Paragraph 418 has some data that I've
12 analyzed. So that's the data for the discharge. I'm not
13 sure if your question is more broadly trying -- not
14 trying. Sorry -- more broadly wanting to include wave
15 forms. Certainly, there's a lot of wave forms in my
16 report. But with respect to the discharge percentage
17 calculations, that's appendix B and paragraph 418 and
18 419.

19 BY MR. MAGEE:

20 Q. Okay. And paragraph -- figure 1 in paragraph
21 418, that comes from the data exported in appendix B; is
22 that right?

23 A. So 418 is described as paragraph 416. I used
24 DeMaw Sim fig 1.revised, and I computed the percentages
25 for that. So that's where that data comes from. And

1 then appendix B starts with figure 5 revised DeMaw and
2 then does all of the different -- different amplitudes.

3 Q. Sorry. I just want to make sure I understood
4 that correctly. Fig 1 referenced in paragraph 418, you
5 calculated that from Dr. Galton's results; is that right?

6 A. So just for clarity, in appendix B, I referred
7 to the figure of the -- in Dr. Galton's second
8 declaration, the one that he's using, and so, that you
9 can match up my simulations for each one of those.

10 So it's figure 5, for instance, and I think,
11 actually, all of the -- all of the figures are labeled
12 figure 5. So there's different simulations.

13 With respect to 418, Dr. Galton did a simulation
14 where he used his original simulation with the -- let's
15 just check this out.

16 So DeMaw Sim fig 1 is his revised using this
17 correct MOSFET -- correct JFETs, and that was what I used
18 to run. So to be clear -- I apologize. If -- 418 is
19 from Dr. Galton's simulations. So it's from the native
20 files that he produced.

21 Q. Okay. So yeah. So just other trying to be
22 clear --

23 A. Yeah.

24 Q. -- figure 1 referred to in paragraph 418 of your
25 declaration, is that your visualization of the native

1 files produced by Dr. Galton?

2 A. This is my dad data plotting of exported data
3 from Dr. Galton's native simulation files.

4 Q. Okay. Got it.

5 And then appendix B is the exported data from
6 your simulation -- your running of the simulation,
7 correct?

8 A. I just want to be correct on this.

9 All of the percent discharge plots are all using
10 Dr. Galton's simulation files. So paragraph 14 figure 1
11 and all of the appendix.

12 Q. And appendix B was generated by using
13 Dr. Galton's simulation files that you ran and then you
14 exported the data that is captured in appendix B,
15 correct?

16 A. The data in appendix B is exported from
17 simulations of Dr. Galton's revised simulations. That's
18 correct.

19 Q. Okay. I just want to be clear you ran the
20 simulations of Dr. Galton's revised simulations used in
21 appendix B, correct?

22 A. I ran all of Dr. Galton's revised simulations,
23 and I'm not sure specific if there's a nuance in question
24 B -- with appendix B. That's what I'm trying to
25 understand.

1 Q. Yeah. Sorry. Just trying to be clear.

2 Appendix B to your declaration --

3 A. Yes.

4 Q. -- has a number of tables of data.

5 A. It does. Yes.

6 Q. Okay. And you ran Dr. Galton's simulations, and
7 the tables in appendix B are exports of data of
8 Dr. Galton's simulation, correct?

9 MS. LEPORE: Objection. Form.

10 THE WITNESS: So appendix B is exports of all of
11 Dr. Galton's simulations. They're from his files. Yes.

12 BY MR. MAGEE:

13 Q. Maybe I'm not asking this well. I apologize for
14 that.

15 As I understood your testimony earlier, you ran
16 Dr. Galton's simulations. In the simulator, you
17 confirmed that they appear to be operating as intended,
18 and then you exported a subset of that data to a file.
19 And those exports are what are those -- contained in the
20 tables of appendix B; is that right?

21 A. I think maybe I understand your question better
22 now. I apologize.

23 I ran all of Dr. Galton's simulations. I
24 exported data and I analyzed it for several of the
25 simulations. And then I -- if -- I apologize if I wasn't

1 getting this in your question before.

2 I think you're asking is, did I prepare all of
3 the tables -- let me rephrase that.

4 Did I run the simulation and export the data for
5 all of the tables? I had an associate who works for me
6 as a Ph.D., after I had done several of them, set up the
7 format, I asked them to run the assimilations -- because
8 there's quite a few -- and I prepared the tables and then
9 I reviewed the tables once they were done, and then I put
10 them in appendix B.

11 Q. Okay.

12 MS. LEPORE: Is now a good time to take a
13 break>.

14 MR. MAGEE: Yeah. We were going a little bit
15 long there, but now is great.

16 THE WITNESS: Okay. All right. Thanks.

17 MR. MAGEE: Can I take, maybe, ten minutes this
18 time?

19 THE WITNESS: Sure.

20 (A recess was held from 11:26 a.m. to 11:45 a.m.)

21 MR. MAGEE: Back on the record.

22 BY MR. MAGEE:

23 Q. Dr. Ricketts, if we could go back to your
24 declaration and go all the way up to the section starting
25 paragraph 49.

1 A. Okay. I am there.

2 Q. Okay. Just a pretty simple question. Paragraph
3 50 and 51 look to be identical. Was that just a typo
4 or --

5 A. That looks like a cut-and-paste error.

6 Q. Okay. All right. I was just making sure there
7 wasn't anything that you intend to be different between
8 the two?

9 A. Right. No.

10 MR. MAGEE: I actually have no further
11 questions.

12 MS. LEPORE: We have no questions for the
13 witness.

14 THE REPORTER: Before we go off the record, I
15 have a rough draft order. Did both sides need the rough
16 draft?

17 MS. LEPORE: Yes, please.

18 THE REPORTER: I had a note for delivery on
19 July 1st. Is that still correct?

20 MR. MAGEE: Josh or Rishi, is that consistent?

21 MR. GRISWOLD: Yeah. That works for us.

22 MR. GUPTA: That's right.

23 MS. LEPORE: If that's what you have down for
24 us, too, then yeah.

25 (Whereupon proceedings concluded at 11:47 a.m.)

THE SULLIVAN GROUP OF COURT REPORTERS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

SIGNATURE OF DEPONENT

I, the undersigned, DAVID RICKETTS, Ph.D., do
hereby certify that I have read the foregoing deposition
and find it to be a true and accurate transcription of my
testimony, with the following corrections, if any:

PAGE	LINE	CHANGE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DAVID RICKETTS, Ph.D., Date

THE SULLIVAN GROUP OF COURT REPORTERS

REPORTER'S CERTIFICATE

I, NICOLE HATLER, a Shorthand Reporter, State of California, do hereby certify:

That DAVID RICKETTS, Ph.D., in the foregoing deposition named, was present and by me sworn as a witness in the above-entitled action at the time and place therein specified;

That said deposition was taken before me at said time and place, and was taken down in shorthand by me, a Certified Shorthand Reporter of the State of California, and was thereafter transcribed into typewriting, and that the foregoing transcript constitutes a full, true and correct report of said deposition and of the proceedings that took place;

IN WITNESS WHEREOF, I have hereunder subscribed my hand this 30TH day of JUNE 2025.



Nicole A. Hatler Texas CSR 11275
Expiration Date: 11/30/26
California CSR 13730, EXP 6/30/26
New Mexico CCR 588, EXP 12/31/25
NHatler@Ymail.com

THE SULLIVAN GROUP OF COURT REPORTERS

- ---000--- 3:12 0 0 39:21 57:2 0.26 59:11 0.26328 59:14 06202 30:19 1 1 12:4 49:3,6,8,9 51:25 60:22 62:2,5 67:20 68:4,16,24 69:10 1.9 55:18,20 59:21 1.99 60:1 1.9999 59:24 1.revised 67:24 10 54:25 55:8,15 57:2,15 65:5 10.25 50:18,24 10:09 40:3 10:23 40:3 10C 40:25 11.9 55:16 11.99 55:3 11:26	71:20 11:45 71:20 11:47 72:25 12 50:25 51:9,19,21,23 55:2,9 13.5 50:18,24 13730 5:6 139 48:24 14 54:20 69:10 144 53:4 16 39:21 160 39:20 41:5 42:12,23 1602 41:17,22 42:8 47:14,19 48:7,15 1604 44:2 45:7 1608 43:14,19,23,25 1620 44:3,7,9,19 1624 44:7 1642 41:9,12,18 1644 42:6,12,23 1662 47:19 160 33:1 39:18,20,23 41:7, 8,16 43:7,14,22 44:5,22 45:4 46:1,10,12,16,20 47:3,13	17 9:19 42:10,14 43:10 171 40:25 18 29:6,9,10 31:5,8,13 32:6,9,14,21,24 33:4, 12,18,20,25 34:17,21 35:1,6,15 36:5,21 37:2 38:5,11,25 40:20 44:10, 20 65:6 18.4 37:13 38:3 182 53:21 184 55:17 186 57:19 58:6,7 59:2 19 29:8 41:1 45:13,18,20 199 14:9,11,12,17 15:1 16:1,25 1995 6:17,24 1996 7:10 1997 6:18 1999 6:24 7:24 1st 72:19 2 2 55:10 56:1 59:25 60:1, 11 61:4 62:3,5,13 65:15 20 8:17 12:2,3 25:4 53:23 54:19 65:6 200 52:17 54:2,22 55:5 2000 8:13	2001 7:24 2002 8:14 9:1 2003 9:1 2006 6:22 9:13,15 201 52:17 54:3,23 55:6 202 783-5070 3:21 2021 5:23 6:13 48:22 2024-00934 5:19 2025 3:5 21 29:8 41:1 22182 3:16 23 29:9 24 52:24 25 18:25 19:6 25TH 3:5 26328 59:18 27 30:14,16 28 19:19 24:17 3 30 30:16 45:25 3200 3:20 342 28:19,21 39:16 40:19
---	---	--	--

THE SULLIVAN GROUP OF COURT REPORTERS

41:5	51 72:3	7	academia 9:14
35 54:24	52 13:12,17	7 10:1	access 6:7
37 30:18	53 12:7	70 14:10	accurate 22:14 27:4,11 66:23
3790 4:3	55 12:16 13:9	74 19:14,16	action 3:9
38 9:19	55402 3:20	7496342 5:19	actual 20:9 29:18 50:20 55:12
39 46:3	5_revise_demaw 55:4	78 19:18,22 21:4 24:11 26:10 28:16	additional 56:1
4	6	79 20:15	address 40:25
408 57:22	6 45:21	8	advanced 9:2
409 57:23	6.4481 59:4,7	8 18:13	agree 31:5
41 10:4	60 3:20	80 21:6,8,10	ahead 30:22
416 67:23	62 31:15,17,20,24 32:11, 22,25 33:12,17,22 34:3 35:7 36:6 37:3 38:12 45:25	81 21:11,13	air 29:23
418 48:24,25 49:3,6 50:6,7 53:6,7,8,16,25 54:22 55:5,23 60:4,12,15,16 63:2 66:4,5 67:11,17, 21,23 68:4,13,18,24	6200 31:21,25 39:17	82 21:14,16	Allowing 17:13
419 53:9 55:11 56:20 67:18	6202 30:21 31:4 34:3,5	8229 3:16	Alto 4:3
42 11:1	6204 35:7,9,19,23	846 4:3	AMD 9:7,10
450 3:16	6206 37:3,7,18 38:2	9	American 6:25 7:1,2,4,6,9
49 30:9,11,12 31:4 39:16 45:24 46:2 71:25	6208 38:12,17 39:10	917 829-0235 3:17	amount 59:22 62:17
5	622 7:14	94306 4:3	amplification 13:19 47:9 48:2
5 65:6 68:1,10,12	65 19:5,7,8,11	9:08 3:5	amplified 46:5,25
50 23:18 24:2,6,11 25:2,3 26:14,24 27:4,6,9,10 45:21 72:3	650 332-1701 4:4	A	amplifier 44:7 45:4,6,8 46:5,9,14, 25 48:11
	67 19:8,12,16	a.m. 3:6 40:3 71:20 72:25	amplifiers 8:12
	68 19:14	abruptly 23:25 24:1,24,25	amplitudes 68:2
			Analog

THE SULLIVAN GROUP OF COURT REPORTERS

7:2,11	art 25:12 26:21 27:21 28:4	basically 58:3 61:15	broad 21:1
analysis 67:7	assimilations 71:7	basis 31:11	broader 53:13
analyze 60:19,21 66:23	associate 71:5	beginning 57:25	broadly 67:13,14
analyzed 57:18 61:7 67:5,11,12 70:24	assume 29:3	behalf 5:18	
analyzing 60:10	assuming 40:2	behaving 66:21	C
and/or 46:5,9	attracted 10:10,14	behavior 66:1	C4 49:8 50:22 51:16 64:17
antenna 29:25 30:2,5 31:1 34:12 47:7,8 48:1,10,11	audio 8:12	bias 43:23,25 51:4,7,8	C5 49:8 51:16 64:17
apologize 19:2 33:9 68:18 70:13, 22,25	average 51:9,16,18,20	billions 56:6	CA 4:3
APPEARANCES 3:13	averaged 51:22	binary 63:9	cable 31:2 34:13,19 48:13
appeared 3:8	aware 26:6	biological 26:7	calculate 53:11 56:24
appears 21:5	axis 50:10,12	bit 6:14 9:16 10:3 12:20 14:8 18:24 27:7 30:7 48:23 49:14 54:10 71:14	calculated 58:22 68:5
appendix 50:20 53:3,12,15 54:4, 6,8,24 55:4,8,14 56:7 57:1 60:3 67:10,17,21 68:1,6 69:5,11,12,14, 16,21,24 70:2,7,10,20 71:10	B	blown-up 29:2	calculations 56:8 67:17
application 22:21 23:4,8,16 25:9	bachelor's 6:17	Blue 4:2	California 3:8 5:5
applies 12:17	back 18:23 40:19 45:24 48:20,22 53:24 57:1 66:10 71:21,23	Boone 3:16	call 26:15 40:11 51:7,8 58:12
apply 38:1 48:6	background 6:15 9:24 10:2 19:9,17	bother 62:5	called 15:20
approximately 24:6,11 26:23 27:3 50:18,23,24 53:23,25 54:19,21 55:1,7,18 59:15 60:22	backgrounds 9:18	bottom 50:5,6	Camino 4:3
arrange 33:14	balance 42:15	Boulevard 3:16	cap 57:21 58:12 59:3,11,13
arrow 13:2	balanced 42:15	boundaries 24:15	capacitor 35:3,4,8,12,13,17,18,22 37:4,5,9,11,15,19 38:14,21,23 39:3 43:18, 19,21,24 44:2,4 45:7,10 50:13 51:6 58:20,21 64:19,20
	base 9:9	box 33:22 47:14	capacitors 19:14,17 36:23,24 37:15,17 38:7 44:12 51:19 58:8,10,24 64:4, 21,22
	based 18:8,10 61:22,25	break 7:1 39:25 40:1,10 71:13	
	Basic 9:20	breaks 40:13	

THE SULLIVAN GROUP OF COURT REPORTERS

caption 49:8	characteristic 24:25	36:11,21 37:2 38:1,3,5, 11,25 39:10 40:19 44:10,20	33:21
capture 26:3 54:16 55:21 56:1,4 57:8 62:8,10,16,21 63:6,8 66:1	characteristics 21:8,12	claims 28:22 29:6 31:11,13 32:12 33:16 41:1 45:13, 18,20	computed 67:24
captured 56:6,21 62:11,23 64:20 65:12,14,18 69:14	characterize 23:11	clarification 31:22	concept 16:11 20:22 26:9
captures 56:1	charge 11:5,8 57:23,25 58:1, 24,25 65:23	clarify 33:7	concepts 9:20
capturing 52:6 65:19	charged 10:11 59:6	clarity 32:17 33:16 45:5 48:10 68:6	concerned 8:10
carrier 34:14,20 41:10,16,19, 22 42:2,6,11,13,16,18, 23 43:5,6,8 44:6 46:15, 16 47:2 49:24 50:1 60:6 61:5 65:24	charges 10:9,14,18 45:20	classes 20:9	concluded 72:25
carriers 65:25	charging 36:22 37:4,8,10,14,22, 24 38:2,6,13,21,22 39:2,8,12 43:18 44:11	clear 34:21 45:2 55:22 59:24 68:18,22 69:19 70:1	conduction 16:6,16
carries 42:2	chart 31:20,24	clock 55:12,13	conductive 15:18
carrying 11:8	charts 60:2	clocks 7:22	conductor 11:11
case 16:18	chat 6:10	close 14:5	CONFERENCING 3:1
cases 53:14	check 14:1 40:12 53:18 63:15, 18 64:11 66:24 68:15	collected 62:2	confirmed 70:17
cell 7:21	checked 63:20,21 64:6 66:24	column 30:9,11,12 31:4 39:16 45:24 46:2	confusing 46:23
centered 50:25	chips 8:23	columns 59:8,19	confusion 58:9
Certified 3:7 5:5	choose 59:21 64:16	commencing 3:5	connecting 36:12
cetera 18:7	chose 59:25 60:8 61:22 62:12	common 13:6 24:21 42:14	connection 5:23
chain 7:17	circuit 9:20 11:5 13:5 25:24 57:11,16 61:13,15 63:1 67:2	communicate 27:18	considered 16:22 23:14
change 58:22,25	circuits 8:5 9:11 49:2,5 57:5,14 65:7	complete 51:25 52:2,11 54:8	consistent 18:21 72:20
changing 15:23 61:20	claim 29:6,10 30:1,6 31:5,8, 13 32:6,9,10,14,21,24 33:4,12,18,20,25 34:17, 21 35:1,5,15,18,21	completely 14:5	construction 36:11 38:1,2 39:12
channel 14:3,22,24		components 47:1	construed 36:10
		comprising	contained 70:19
			context 25:17,23 29:20 45:13, 18
			continued 14:1 61:18

THE SULLIVAN GROUP OF COURT REPORTERS

continuous 9:15	corrects 44:4	9,11,22,25 38:3 43:19 49:20,22 52:2,7,8 55:21,23 56:3,4 60:22 61:1 62:4 63:2 65:14,20	27:7
control 37:3 43:18	Counsel 39:24		defining 26:6
controlling 36:21 37:8,10,14,22,24 38:2	count 25:14 59:16	cycles 26:24 38:6,13,21,23 39:2,9,13 44:11 54:17 56:11,14,17 60:12 61:4 62:3,12,21,22 63:3,6, 12,14,16,20,22,23 65:18	definition 21:19,20
convention 10:22,24 11:20,23	couple 14:20 35:8,12 36:5,15, 16		definitions 15:3
conventional 11:15	coupled 36:24 37:5,16 41:16,22 42:6,11,17,22 43:15,17 44:3		delivered 49:12
conventions 11:12	coupling 35:2,11,16 36:4,9,14, 15,17 43:20	D	delivery 72:18
conversion 6:25 7:2,5,7,9 34:21,24 42:15 47:11 48:5	cover 19:16 54:16 56:12,17	dad 69:2	Demaw 13:2 14:13,14 15:6,13, 17 17:1,10,22 18:12,16 49:3,5 58:9,10 59:1 64:18 67:24 68:1,16
convert 48:15,17	covering 40:20 56:11	Daignault 3:15	depend 29:6,9
converted 38:8 44:6	covers 55:23	darn 14:7	depends 20:23
converting 29:11 31:21,25 33:19, 20,23 40:21	create 15:21 43:11	data 14:2,5 49:15,18,19,20 50:20 51:22,24 52:1,2, 12 53:8,11,15,18 54:3, 13,15,16,19 55:3 56:1, 10,22 60:9,17,18,19,21 61:3,6 62:9,11,16,23 63:9,15 64:14 65:4,12 67:4,7,10,11,12,21,25 69:2,5,14,16 70:4,7,18, 24 71:4	depletion 14:4,24 15:20,22 16:3
conveyed 28:15	created 20:6	date 49:13	DEPOSITION 3:1
correct 5:15,24,25 6:16,19,20, 22,23 7:12,15 8:1,15 9:5,6 10:20 11:9,17 14:15,16 15:9 19:15 20:6,13,14,19 21:9,12, 15 26:25 28:8 29:4,7,12 30:3,4 31:2,6,19 33:19, 23,24 34:1,4,20 35:4,8, 20 39:19 40:18 42:19 43:16,24 44:14,16 45:19 46:11,16 47:3,15 49:5,10,16 50:10,11,15, 23 51:2 52:1,13 55:16, 19,20 59:14,16,18 60:15,23,25 61:24 62:18 63:16 66:9 68:17 69:7,8,15,18,21 70:8 72:19	creates 47:24	derive 22:2	describe 11:13 12:7 21:16 27:21 28:5,11 35:23 45:16,20 57:23
corrected 47:22	creating 47:21	David 3:1,8 5:1,10	describes 13:17 34:21 41:15 42:8, 14 43:4 44:5 45:17
correctly 15:16 26:2 50:17 54:24 55:2 64:8 68:4	current 10:22,24 11:1,4,10,12, 15,22,24 16:5,6,9,11,21 17:9 66:21	day 3:5	describing 11:24 17:7 22:3 29:10, 24 45:25
	currents 16:14,15,16 64:6,11	de 15:18	description 13:5 21:17 22:16 44:8
	customer 9:9	declaration 5:22 6:13 7:13 8:2,16 9:12 11:4 12:3 13:12 14:9 19:19 20:11 24:17 40:24 48:20,22 64:5 66:8,11,12 67:6 68:8,25 70:2 71:24	description's 32:25
	cut-and-paste 72:5	Defendant 4:1	design 7:14,25
	CV 58:2	defined	detailed 9:17,24 10:1
	cycle 23:17 24:7,12 25:2,4,21 26:12,14,18 27:1,4,6,23 28:7,12,14 36:22 37:4,		determine

THE SULLIVAN GROUP OF COURT REPORTERS

60:21 61:19 65:3	13:23 59:20 65:23 67:12,16 69:9	27:15 28:6 44:23	47:20
develop 9:4	discharged 59:18	drew 20:9	encompasses 32:7 34:18
developed 8:24	discharging 36:22 37:4,9,10,14,22, 25 38:3,6,13,21,23 39:2,8,13 43:18 44:11 64:22	due 58:25	end 17:1 55:17
development 8:17	disclosed 18:10	duly 3:10	ended 42:15 65:10
deviation 23:11	discuss 21:6,8 40:14	duty 23:17 24:7,11 25:2,3,4, 21 26:12,13,18,24 27:1, 4,6,23 28:7,12,14	ends 54:23 55:6,9,16
device 16:5,20 18:5 37:5 43:15,17,20 44:3,19	discussed 32:12 46:19 65:7 67:4		energy 40:20,21 41:1
devices 7:3,11 14:6 15:21 16:13 17:21 18:3 36:23 37:16 38:9 39:5 44:14 51:8	discusses 21:10,11,13,14	E	engineer 21:20 24:22
diagram 19:24 20:16,18,20,21 22:20 23:16 24:3	discussing 19:22 58:10	earlier 22:9 54:18 55:23 66:7, 19 70:15	engineering 6:17,18,22 9:2
differ 26:12	discussion 65:16	Earth 16:10	engineers 9:4
difference 12:23 21:24 22:3 25:8 27:19 34:6 35:11 36:16, 17 58:21	distinguish 12:24 28:8	EI 4:3	English 36:16
differences 27:24 36:1	distribution 23:7	electric 11:1,4	entitled 9:24 30:13
differential 15:8 43:11 44:1	divided 57:24	electrical 6:17,18,22 25:21 36:12	equal 23:2,5,12
differentiation 24:3	document 28:23 29:18	electrically 35:2,7,11,12,16 36:4,5, 9,14,15,24 37:5 41:16, 21 43:17	equals 58:2
differently 37:22 50:9	down-converted 38:14 39:3 44:13 47:21, 24	electromagnetic 29:11 31:25 33:19,21, 23 40:21	error 72:5
differs 26:24 27:1	down-converting 48:15	electron 11:11	essentially 26:4,21
directed 9:3 41:1	dozens 60:9	electrons 10:10,18,23 11:9,13,18, 25	evaluated 63:18
direction 11:12	draft 72:15,16	element 35:22	evaluation 63:25
directly 36:11	drain 12:15,17 14:21 15:24	elements 32:10	exact 61:17 65:14 66:10
disagree 58:17	drawing 23:10	embodiment 30:13,15 31:6,18 32:1, 4,7,15,22 39:18 46:24 47:6	EXAMINATION 5:7
discharge 45:14,22 57:23,25 58:3,	drawn 10:11 21:4 23:13 24:10, 11,17 25:14 26:23	embodiments 31:9,10 33:2 46:4,13	examined 3:10
			Excel 49:18,19 56:22
			exclude 32:14,21

THE SULLIVAN GROUP OF COURT REPORTERS

Exhibit 5:23 6:5,13 48:22 exhibits 6:4 20:12 28:18 expect 64:7 explained 43:9 58:24 explains 30:25 explanation 41:2 export 56:18 60:18,20 63:10, 12 64:14 65:3 71:4 exported 49:19 60:17 61:3,6 63:11,22 66:22 67:3,7, 10,21 69:2,5,14,16 70:18,24 exporting 63:13 exports 70:7,10,19 extensively 13:7	field 26:6 field-effect 12:8,9,10 fig 55:4 64:18 67:24 68:4, 16 figure 14:11 21:4,23 22:17 26:10,20 27:17 28:16 31:14,17,20,24 32:11, 22,25 33:12,17,22 34:3 35:7 36:6 37:3 38:12 39:18,23 41:5,7,8 42:10,12,14,23 43:7,10, 14,22 44:5,22 45:25 46:1,10,12,16,19 47:3, 6,13 49:3,4,6,7,8,9 50:5,6 51:25 53:16,25 55:10,23 60:15,16 67:20 68:1,7,10,12,24 69:10 figures 20:8 50:8,10,12,16 68:11 file 53:18 63:9 70:18 files 49:11,12,13 68:20 69:1, 3,10,13 70:11 filter 44:22 45:17 46:14 47:1 59:1 filtered 46:5 47:1 filtering 47:8 48:2,10 filters 46:10 fine 6:11 Fish 3:19 fixture 46:10 flow 10:19,23 11:18 31:20, 24 36:12	flow/movement 11:5 flowing 11:22,24,25 flows 10:22 11:15 16:21 focused 8:20 focussing 7:6 8:22 forever 54:11 56:6 form 18:11 21:16,18 22:1 23:4,5,23 24:8,18,24 25:1,2,3,15 26:18 27:14 28:9 31:7 32:8,16,23 34:9 35:14 36:7 37:12, 23 38:24 40:23 41:14, 25 42:20 43:2,11 44:15, 21 46:17 47:4 48:8 52:15 53:10 55:13 59:23 60:25 61:9,10 62:7,19 63:17 64:2 65:21 67:8 70:9 format 49:19 71:7 forming 38:14 forms 20:10 24:19,21,23 25:17 27:7 61:20 67:3, 15 found 56:22 frequencies 7:22 27:19 frequency 7:14,16,18 8:8 21:3,5 27:16,23 28:7,11,13 66:3 front 33:17 full 49:20,22 53:12 55:23 57:3 60:22 65:14,19 fully	14:3 functional 44:8 functionalities 13:19 functions 13:15 48:14,17 fundamental 27:16,23 28:6,11,13
F			
fact 64:12 fall 56:24 familiar 26:9 family 26:8 faults 15:18 feel 24:14 54:5 felt 56:10 FET 12:21 17:9			G Galton 51:10 58:16 64:17 66:13,16,25 68:13 69:1 Galton's 49:11 51:3,15,18 54:9 68:5,7,19 69:3,10,13, 17,20,22 70:6,8,11,16, 23 gate 12:15,17 13:2 14:24 15:8,11,13,15,24 16:3 gate-to-source 16:2 gates 15:13 gathering 60:9 general 7:19 9:11,17 16:13 19:11,13,16 20:22 22:23 47:7,18,25 62:16 generally 8:10 15:17,18 34:11 49:2 generate 7:19 38:7 39:3 44:12 60:15 generated 19:25 20:17 49:10 69:12 generating 7:22 give 5:14 18:13 41:2

THE SULLIVAN GROUP OF COURT REPORTERS

good 5:4 39:25 71:12 grammar 36:18 graphed 54:20 great 71:15 greater 53:16 GRISWOLD 3:18 72:21 ground 15:14 16:10 44:1 Group 4:2 guess 23:20 24:14 30:17 65:1 GUPTA 3:19 72:22	15:12 hit 49:12 hour 3:5 39:25 hours 54:12	incorrect 55:25 indicating 59:17 indirectly 36:11 information 29:15,19,21,22,25 31:1 34:1,2,4,7,13,14,18,19, 22,23 35:2,3,8,11,13, 16,17,23,25 38:8,14 39:4 41:13,23 42:2,5,18 43:1,5,9,15,16,20 44:13 46:15,24 47:2,9 48:3,12 50:1,2 52:7 54:17 56:11,13 60:12 61:1,14 62:13 65:25 66:3 input 44:23 45:7 instance 17:18 29:25 34:11 42:16 43:10 45:21 52:23 53:20 68:10 instances 15:25 integrated 8:5 Intel 9:7,10 intend 72:7 intended 57:8,13,15,17 59:8 61:16,20 63:20 65:8,12 66:22 70:17 intent 27:17 intentional 21:18 interconnect 48:13 interpret 36:10 37:8 39:11 interpreting 32:14,21 35:10 37:21 38:20 39:7	invention 30:13,16 31:9,14,18 32:1,2,25 33:3,4,8 inventions 32:3 inverted 35:3,17 42:5,9,10,17, 18,22,25 43:4,8 inverter 42:10 IPR 5:18,23 6:5,6 29:5 issue 28:19 Iyer 3:15
H hand 20:10 handy 28:20 happen 15:11 hard 39:15 Harvard 6:22 Hatler 3:7 5:5 heading 30:12 held 40:3 71:20 high 14:22 15:12 22:18 23:2, 5,12,24,25 24:24,25 27:9 45:12 58:14,17,19, 22 higher 10:10,21 11:16,19	I ICS 8:3,6,18,20 9:5 identical 72:3 identification 61:5 identified 41:18 61:25 62:4 63:2 64:17,19,22 illustrated 39:18 43:22 46:10,12 53:16 illustrates 31:20,24 illustration 12:24 image 20:4,6 50:21 impedance 38:9 39:4 44:3,14,19,24 45:9,15,19,22 important 25:21 imprecise 52:10 54:6 impulse 20:2,5 21:18,19,21,25 22:9,12,17,20,22 26:25 27:2,22 28:5,11 impulses 24:17 include 24:16 67:14 includes 31:5	input 44:23 45:7 instance 17:18 29:25 34:11 42:16 43:10 45:21 52:23 53:20 68:10 instances 15:25 integrated 8:5 Intel 9:7,10 intend 72:7 intended 57:8,13,15,17 59:8 61:16,20 63:20 65:8,12 66:22 70:17 intent 27:17 intentional 21:18 interconnect 48:13 interpret 36:10 37:8 39:11 interpreting 32:14,21 35:10 37:21 38:20 39:7	J JFET 12:8,21 13:5,10 16:17 JFETS 12:13,17 13:6,20,23,24 14:1,14,21 15:17 16:12, 17 68:17 Josh 72:20 JOSHUA 3:18 July 72:19 Junction-gate 12:9 JUNE 3:5
			K kind 13:5 48:13
			L lab 56:23,25 labeled 12:4 23:21 29:14 35:5 41:9 42:6,23 45:8 55:4

THE SULLIVAN GROUP OF COURT REPORTERS

68:11	LO 7:17 20:19 58:14,16,19, 22 65:25	61:21 62:15 63:5,24 64:15 66:6 67:19 70:12 71:14,17,21,22 72:10, 20	meaning 22:22 39:10
late 65:17	load 45:15,19,22	magic 22:7	meaningful 21:24 22:2,8
Law 4:2	local 19:20,23,25 20:17,23 21:1	magnitude 16:14,16,19	means 15:21 24:21 59:20
leads 16:5	located 43:23	main 9:9	meant 20:19 52:4
leakage 16:9,11,13,15,23	locations 3:6	major 36:16	measure 25:5 58:19
left 24:22 41:8	logistics 40:12	make 14:2 17:25 63:16 64:6, 10 68:3	measured 58:20
LEPORE 3:15 18:11 22:1 24:8,18 25:15 28:9 31:7 32:8, 16,23 34:9 35:14 36:7 37:12,23 38:24 39:24 40:5,23 41:14,25 42:20 43:2 44:15,21 46:17 47:4 48:8 52:15 59:23 61:10 62:7,19 63:17 64:2 65:21 67:8 70:9 71:12 72:12,17,23	long 53:24 54:11,13 56:16 61:8 62:25 71:15	makes 64:25	measurements 56:10
letter 39:21	longer 54:4,14	making 72:6	megahertz 7:14
level 57:3	looked 50:4 58:20 60:4,5 62:25 65:10 66:2,4,14,15	management 8:3,6,7,17,20 9:5,11	metal-oxide- semiconductor 12:10
lie 18:9	LOS 7:22	manager 9:2	method 29:11,24 30:13,15 31:18,21,24 33:18,20, 22 39:17 40:20
limit 62:9	lot 67:15	manufacturing 18:6	methodology 56:19,21 58:15,18
limitation 29:17 39:1 44:17	lots 66:13	maps 62:12	microprocessors 9:8
limits 62:17	low 22:17 23:2,5,12,24 24:1,24,25 27:10 45:12, 14,19,22 46:5,9,25	marked 29:17	microsecond 54:2,21 55:7 56:3 60:7, 23 61:2,23 62:2,5
lines 13:3	lower 10:11,20 11:16,18	master's 6:18 7:3	microseconds 52:17 53:22,23 54:3,19, 23,25 55:3,6,8,9,15,16, 18,20 56:2 57:2,15 59:22,25 60:2,11 61:4 62:3,6,14 65:5,15,17
list 53:13	lowest 16:6 17:9 66:3	match 68:9	millions 56:6
listed 15:6 24:22 30:1,2,5 54:13 56:8	M	material 20:8	millisecond 62:11
literally 16:9	MAGEE 4:2 5:7 18:22 22:6 24:13 25:11 26:1 28:17 31:16 32:5,13,19 33:5 34:16 36:3,20 37:20 38:4 39:14 40:1,4,6,8 41:3,20 42:4,24 43:13 44:18 45:1 46:21 47:12 48:18 52:20 60:13	math 58:2	mind 25:17
literature 17:19		mathematical 21:20 22:16	Minneapolis 3:20
		mathematically 22:23 27:5,8	minus 18:15 42:6,11,13,23
		mathematics 22:15	

THE SULLIVAN GROUP OF COURT REPORTERS

43:7,12 45:6 46:16 54:1	22,25 12:1 15:10,15 17:14 18:1,9,10 42:12, 18 45:3,7 58:23 59:11, 14,20	observe 27:24 66:21	overlap 15:3
minutes 71:17		obstructed 14:4	overseeing 8:17
misunderstood 13:8 64:23 66:18	negligible 21:22 22:11,25	occasionally 6:4	overview 19:11,13,17
mixer 47:14,22	Nicole 3:7 5:4	older 13:6	owner 5:18
mixers 47:11 48:4	node 41:9 42:12,13 43:23 44:24 45:3,11,12 65:8	open 57:24	
MN 3:20	nodes 64:11,14,16	operate 14:3 57:17 63:20 67:1	P
mode 15:20 61:20	noise 46:5,9,14,25	operating 57:6,15,16 61:15,19 63:19 64:1 65:12 66:9 67:2 70:17	P.C. 3:19
model 17:17	nominal 17:18	operation 57:6,9,13 63:1 64:6	pages 28:23
modulated 49:20,22 55:21,24 60:22	non-power 8:7	opinion 18:2 24:5	Palo 4:3
modulation 34:14,20 49:25 52:3,7 60:5,6 61:5	normal 57:6,9 63:1	opposed 56:2 57:2 65:6	paragraph 9:19 10:4 11:1,7 12:7, 16 13:9,12,17 14:9,12, 17 15:1 16:25 19:2,5,7, 8,14,16,18,22 20:15 21:4,8,10,11,13,14,16 24:10 30:18,22,24,25 31:3 36:5 40:25 48:24, 25 49:3,6 50:7 53:3 54:20 55:5,10 56:20 57:22 66:5 67:11,17,20, 23 68:4,24 69:10 71:25 72:2
moment 11:15 14:11 47:18 48:20 55:10 57:22 59:3	note 25:1 72:18	opposite 10:15	paragraphs 21:6
morning 5:4,8	Notice 3:4	optional 46:9	parameters 25:22,23,24
MOSFET 13:10,11 16:9 68:17	noticeable 25:4	order 18:14,16 60:15 72:15	part 7:17 10:24
MOSFETS 12:9,13,18 13:20,24,25 16:8,15,23	nuance 27:18 69:23	orders 16:14,15,19	parts 7:21 39:16 64:5
moving 11:9,10	number 6:5 17:24 53:19 59:5,15 63:10 70:4	original 68:14	pass 48:12
multi-phase 9:4	numbers 19:2	originally 59:21	past 61:13
multiple 7:20 63:21		oscillating 7:20	patent 5:18,19 28:19 29:1,18, 20 30:9 31:9,10 32:3 33:9,12 39:17 40:19 41:5,15 42:8 45:16 47:6,16,18
N	O	oscillator 20:1,17,23 21:1	
native 68:19,25 69:3	Objection 18:11 22:1 24:8,18 25:15 28:9 31:7 32:8, 16,23 34:9 35:14 36:7 37:12,23 38:24 40:23 41:14,25 42:20 43:2 44:15,21 46:17 47:4 48:8 52:15 59:23 61:10 62:7,19 63:17 64:2 65:21 67:8 70:9	oscillators 19:20,23	
naturally 10:10,19		outlined 37:25	
negative 10:9,18,19,23,24 11:16,		output 45:9 51:6 59:1	

THE SULLIVAN GROUP OF COURT REPORTERS

pattern 62:1 65:11	5,11 16:4,19 17:7,20 18:2,9,13,17	practice 33:3	66:25
PDF 9:19	Plaintiff 3:14	preamble 29:13 33:18	providing 19:9
Peak 4:2	plot 52:14,16	precise 19:3,4 47:16 49:14 54:10 63:8	PS 45:12
percent 23:18 24:2,6,11 25:2,3, 4 26:14,24 27:4,6,9,10 45:21 57:23 58:1,3,22, 25 59:7,9,18,19 69:9	plots 64:5 66:8 69:9	prepare 71:2	public 18:18
percentage 57:21 59:3,11,13 67:16	plotted 49:20 50:5 56:23 60:4 64:3 66:5,20	prepared 71:8	published 17:14 18:15,18
percentages 53:11 67:24	plotting 49:17 69:2	present 32:1,2	pulse 20:1,5 21:14,16,21,24 22:10,13,16,19 23:10, 13,16,21,23 24:1,4,6,16 25:8,14 26:4,11,14,15, 24 27:2,8,12,22,24 28:5,7,10,12,14
perfect 56:5	plurality 38:6,13,20,22 39:1,8 44:11	pretty 72:2	Pulses 22:18
perform 38:12,18,22 63:25	PMB 4:3	previously 16:7 65:7	purpose 65:22
performed 49:4,16	point 52:21 55:3 59:25	principally 7:4 8:5	purposes 29:5
performing 38:5,20 39:1,8 44:10	points 53:19 54:13,15 56:7,23 61:7 63:11	printed 33:17	pursuant 3:4
period 7:4 20:21 23:2 50:3 54:15 57:5,7,9,10,24,25 61:13,18 67:4	polarity 10:17	printout 28:25 29:3	put 6:9 22:7 39:12 48:19 71:9
periodic 65:24	port 41:17,22 42:6,11,12,18, 23	proceeding 6:5,6	Q qualification 6:14 question 22:4 23:20 32:18 39:7 46:22 55:14 65:1,2,13 67:10,13 69:23 70:21 71:1 72:2 questions 72:11,12 quick 40:11 quote 17:1,2,13 R R-I-C-K-E-T-T-S
person 25:12 26:21 27:20 28:4	portion 8:21,23 52:18	proceedings 72:25	
personally 3:8	POSITA 13:4 16:22 24:20 25:6, 16,20 26:10 31:12 33:2 34:10 42:1 45:23 57:15	processors 9:10	
Ph.d. 3:1,8 5:1 6:21 9:13 71:6	positive 10:11,19,23,24 11:15, 22,25 12:1 15:14 16:3 58:23,25	produced 3:9 68:20 69:1	
picked 57:5	power 6:25 7:2,4,7,9 8:3,6,17, 20,21,23 9:4,11	professional 6:14	
picture 23:19,21	practical 22:24	project 7:19	
pieces 36:8,19	practicality 56:9 57:12 60:8	projects 8:6,9	
pinch 14:22,24		proper 13:22 58:19	
pinch-off 14:18,19,20,25 15:2,4,		protons 10:11	
		provide 9:17 13:14,18 67:7	
		provided	

THE SULLIVAN GROUP OF COURT REPORTERS

5:12	8:8 41:17,22 42:8 47:19,23 48:6,14,16,17	REMOTE 3:1	respect 67:16 68:13
R1			
18:12		REMOTELY 3:13	respective 3:6
radio 7:16,18 8:8	receiving 29:15,24 33:25 34:2,25 47:21	removed 44:7	restate 11:23 48:9 58:15
ran 49:18 60:20 61:11 62:11 66:20 69:13,19, 22 70:6,15,23	recess 40:3 71:20	renaissance 7:25	result 65:25
range 17:16,23 18:1,2 50:17 52:22 53:9,12	recognize 26:22	repeat 28:2 32:18 60:7 62:5,23	results 49:9 54:8 61:12,23 63:21 66:11,13,14,15, 23 67:1,3 68:5
ranges 50:17,20	recollection 16:18	repeated 52:4,5	reviewed 71:9
rate 58:3	record 5:9 40:2,4,5 71:21 72:14	repeating 60:11 62:1,21 65:11 66:3	revised 68:1,16 69:17,20,22
re-ask 46:22 52:9	refer 6:4 14:17 23:17 47:17 58:4	repeats 60:1 63:16	RF 7:7,20,23 8:4,19,23,25 9:8 29:21 31:1 34:3,7, 11 35:8,13,24 41:13,21, 23 42:5,9,10,16,17,18, 21,22,25 43:4,16 46:4, 14,24 47:2,7,9 48:1,3, 12 50:3 51:6 55:12 56:13 65:24
read 29:1 30:22,24 35:15,19 39:6 49:19 54:23 66:10	reference 6:7 20:8 37:18 39:18 49:6 53:1 64:18	rephrase 11:3 54:7 71:3	RGUPTA@FR.COM 3:21
reading 18:8 36:4 44:17 50:16	referenced 49:3 68:4	report 9:23 18:24 19:5 58:18, 24 67:16	Richardson 3:19
ready 33:15	references 13:1,7 35:23	reporter 3:7 5:4,5 31:22 72:14, 18	Ricketts 3:1,8 5:1,8,10 40:9 71:23
Real 4:3	referred 11:10 68:6,24	represent 63:1	rides 56:13
realize 53:2	referring 17:12 20:3 46:19 47:15 53:4	representative 20:7,10 62:12	rise 56:24
reason 5:14	refers 33:1 35:24 42:13 47:18 49:7	represented 13:3	Rishi 3:19 72:20
reasonable 17:23,24 18:17 62:17	reflect 18:3	request 6:9	RO 41:16
reasons 58:17 65:15	regarded 8:11	require 23:1	ROBERT 4:2
recall 8:7,9,11 17:18 56:18 61:17,18 63:13	region 14:4 15:22 16:3,24 17:11	requires 44:10	Robert@bluepeak.
receive 34:3,12,19	regions 14:24	reran 66:12	law 4:4
received 6:16,21 9:13 29:23 31:1 34:11 42:9,21 46:6,15 47:2	related 28:12	resistance 44:23	rough
receiver	REMEMBERED 3:4	resister 45:8,9,16	
		resisters 19:1,9,11	

THE SULLIVAN GROUP OF COURT REPORTERS

72:15	sets 51:18	43:1,4,9,15,16 44:6	20:1,4 21:9,10 26:22
roughly 25:2 30:16	setting 13:22	46:4,15,25 47:2,9,21,24	27:3,9
rows 59:11,13,16	shape 23:23 24:25 25:7,20 26:13,18 28:15	48:1,3,12,15,16 49:21, 23 50:1,2 54:17 55:21, 24 60:5,12,22 61:14 62:13,20	single 43:11
run 49:12,13 54:11,14 56:5, 16,18 59:22 60:14,18 61:8 62:17 68:18 71:4,7	shapes 26:11	signals 7:20 19:25 20:16,19,20 25:13 27:15 28:6 38:8 39:4 42:16 44:13 56:12 66:1,2	site 56:11
running 69:6	Shawn 5:10	significance 65:19	situation 34:18
runs 50:21 52:13 54:12,25	sheet 14:2,5	significant 22:19 23:11 45:14	Sixth 3:20
S	short 21:21 22:10	significantly 24:2 25:3	skill 25:12 26:21 27:20 28:4
S-H-A-W-N 5:13	Shorthand 3:7 5:5	signing 40:6	slight 23:6
scale 54:22	show 20:19 49:20 52:4 53:9 56:24 62:21 64:5 65:22	Sim 67:24 68:16	slightly 65:1
schematic 12:21,24	showing 12:16 53:8	similar 16:11 23:23 26:11 36:2	slowly 28:3 49:25
science 6:17	shown 21:23 22:19 23:17 24:3, 4 42:10 45:4 51:24 52:11 56:19 60:12 61:17 62:2	similarities 25:7 32:11	small 59:4
script 56:23	shows 13:2 20:16,20 43:10 52:16	simple 72:2	smaller 16:16
scroll 9:16 10:3 12:2 14:8 30:8 59:12	side 41:8	simulated 64:12,13 66:24	sort 12:23 26:7 57:9 63:25
section 6:15 9:18,23 10:1 12:3 18:25 19:1,17,20 38:1 39:12 40:25 41:2 45:25 49:1 50:4 52:5 71:24	side-by-side 33:11	simulation 17:17 49:2,9,11,18 50:2 51:3,10,15,18 52:12,19, 21 53:13 54:11,12,14, 15 56:6,9,16 57:4 59:22 60:14,18,20 61:6,23,25 62:18 63:4,21 64:8,9,10 65:23 66:11,13,14,15, 25 68:13,14 69:3,6,10, 13 70:8 71:4	source 12:15,17 15:9,13,14,15 16:2 20:12 51:10
sections 9:17	sides 72:15	simulations 49:4 53:13 54:9 56:8 60:9 62:25 63:19 64:1 66:12 68:9,12,19 69:17, 20,22 70:6,11,16,23,25	South 3:20
selected 18:13	sign 27:11 45:6	simulator 60:17,25 61:8,12 63:9, 22 66:8,20,21 70:16	speak 24:19
Semiconductor 8:14 9:2	signal 18:5 23:2 29:11,15,19, 21,22,25 31:1,25 33:19, 21,23 34:1,2,4,7,8,12, 13,14,18,19,22,23,24, 25 35:2,3,8,12,13,16,17 36:12 38:15 40:21 41:13,16,21,24 42:2,3, 5,9,10,15,17,19,21,22	sine	speaking 32:3
sense 64:25			speaks 23:19
sentence 18:21 46:4,8			specific 13:11 16:5,17,20 17:11 22:4,15 23:8,16 24:10 36:17 46:18 47:6 51:12 69:23
set 51:9,15 52:11 54:8 71:6			specifically 9:9 22:21 48:24 50:21
			specification 43:3 44:5,8 45:16 47:23

THE SULLIVAN GROUP OF COURT REPORTERS

spend 62:24	33:25 34:2 35:1,5,7,15 36:21 37:2,3,21 38:5, 11,12,25 39:6 64:9	symmetric 27:14	34:17 36:10 37:25 47:17
spoken 16:7	steps 33:21	sympathetic 29:3	terminal 41:18 45:3
spread 17:14 18:15,19	storage 43:21	synthesizer 7:14	terminals 12:14,19,22 13:22 43:24
square 20:1,5 21:12,13 23:1,6, 14,22,24 24:4,5,15,16 25:14 26:4,11,15,23 27:1,8,22 28:5,10	stored 57:25	system 8:25 9:2,4 20:23 25:24 40:20,22 41:2 44:1 47:7	terminology 23:9 24:22 26:17
standalone 7:21	stores 63:9	systems 7:16,18,23 47:10 48:4 51:6	terms 27:22 28:6 33:8 58:4
standpoint 22:24	Street 3:20		testified 5:3 16:8 66:19
start 30:18 57:2,14 64:9 65:3,8,16	strict 21:20	T	testify 5:18
start-up 61:13	strike 38:18	table 55:15,17,19 58:6	testimony 5:15 40:15 70:15
starting 9:19 19:5,18 30:18 31:4 40:25 45:25 46:3 71:24	submitted 5:22	tables 57:20 70:4,7,20 71:3,5, 8,9	thesis 7:3
starts 46:4 53:21 54:22,25 55:5,8,15 57:4,12 61:14 68:1	subsection 12:4	taking 40:12 56:10	thing 64:4
startup/wake-up 65:9	subset 22:12 26:4,8 51:25 52:12,18 66:22 70:18	talk 11:1 22:21 23:15 40:9	things 7:22 28:1,2
state 3:7 5:8 11:4 13:13 17:8 20:15 25:19 66:12	substance 40:14	talking 14:12 45:2,11,13 47:5 49:2	thinking 25:25
stated 31:3 60:24	Suite 3:16,20	Taylor 40:11	time 16:8 21:7 27:9,10 39:25 50:10 52:12,18 53:8,12, 13,21 54:22 57:1 59:22 61:16,17,23 62:12,17, 25 64:12,13 65:3,9,10 67:4 71:12,18
statement 14:2	supply 51:14,17,21	Taylor 3:15 40:11	times 52:4,5 54:1 56:25
states 39:17 65:22	support 31:11	team 9:4	timing 40:12 55:11
stating 18:12	switch 13:14,18,21 28:18 37:19 43:22,25 45:10 57:24 58:13,16	technical 19:9	TLEPORE@
stay 59:2	switching 36:23 37:5,16 43:15,17, 19 47:20	technologies 8:18	DAIGNAULTIYER.
stays 24:24	sworn 3:10 5:2	technology 9:18,24 10:2 31:12	COM
step 21:7 29:14 30:19 31:4	symbol 12:16 13:9	temperature 18:6	3:17
	symbols 12:20	ten 53:22 59:11,13,16 71:17	today 5:15 6:2 9:15
		term 17:2 21:1 22:8 26:7	top 12:3
			total 52:12,21 57:24 58:1

THE SULLIVAN GROUP OF COURT REPORTERS

transceiver 8:22	19,20,22 26:3,13,17 33:2,4 34:11 36:13 42:1,25 43:6 45:5,23 47:20 54:6 57:16 69:25 70:21	Vgs(off) 17:2,5,8,15	28:5,10 43:11 53:10 55:13 60:25 61:9,20 67:3,14,15
transceivers 7:8 8:4,19 9:8		video 40:7	waves 26:5
transfer 40:20,22 41:1	understanding 5:21 15:1 17:8 20:18 32:2,6 38:18 41:23	Vienna 3:16	ways 13:4 14:21
transient 57:9	understands 31:12	view 33:11 52:3	widen 26:14
transistor 12:4 17:11 57:3	understood 11:14 15:10,16 16:23 17:25 58:11 66:19 68:3 70:15	viewed 60:25 61:9,11	wider 50:3
transistors 12:8,9,10 13:13,14,17 14:13,14 18:25	unit 11:8	virtual 44:1	width 21:22 22:11,19,24,25 24:1,6 25:8,21 27:12, 22,24 28:7,12,14
transitions 23:24,25	units 50:14	visualization 49:15 68:25	windows 33:14
transmitter 8:8	upper 45:5	voltage 10:6,8,19,20,21 11:16, 19 14:18,19,20 15:1,2, 4,5,7,8,11,13,15 16:2 17:7,20 18:9,13,17 49:8 50:13,22 51:4,9,10,14, 17,21 52:22 64:3 66:20	wires 11:11
triangle 45:6	V	voltages 10:10,12 15:24 18:3 58:4,20,21 64:6,11,20 65:8	word 30:5 47:22 63:8
true 5:14 14:2	VA 3:16	volts 15:5 17:15 18:1,10,14, 15,16 50:14,18,25 51:9, 19,23 52:24	words 32:11 35:19,21 36:2 39:6,9 66:10
turn 6:12 15:22 28:18 41:4 48:20	values 15:4 22:17 45:17 50:17 58:13	W	work 7:7
turned 13:23	variation 17:20 18:3 50:4 60:5	wake 57:5	worked 6:24 7:2,11,24 8:3,5,14 9:3
Turning 40:19	variations 18:6 23:6 52:6	wake-up 57:7,10 65:10	working 7:4 64:8,10
turns 15:3	varies 51:19	wanted 6:13 56:20 62:21 65:15 66:1	works 71:5 72:21
type 34:25	variety 8:18	wanting 67:14	world 56:5
types 12:8 13:13 19:25 20:16	vary 12:20 52:22	wave 20:1,4,5,10 21:9,10,12, 13,16,18 23:1,4,5,6,14, 21,22,23,24 24:4,5,15, 16,19,20,23,24 25:1,2, 3,14,17 26:11,15,17,22, 23 27:1,3,7,8,9,11,14	writing 36:18 44:6
typically 16:15 47:10 48:4	varying 49:25 50:3		written 34:5
typo 72:3	verified 67:2		Z
U	version 29:2 47:24		zoom 3:6,13 53:9 55:11
Uh-huh 10:5	Vgs 14:13 17:12,16 18:13		
understand 5:17 13:4 22:22 23:8 24:21 25:6,7,9,13,18,			