

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

MEDIATEK, INC.,	)	
Petitioner,	)	
vs.	)	IPR2025-00030
PARKERVISION, INC.,	)	U.S. Patent No.
Patent Owner.	)	8,498,593

VIDEOTAPED DEPOSITION
OF
DAVID RICKETTS, PH.D.
November 3, 2025 - 9:59 a.m.
Raleigh, North Carolina

Stenographically
Reported by: Lisa A. Wheeler, RPR, CRR

A P P E A R A N C E S:

On behalf of the Petitioner:

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Also Present: Carl Riehl, Videographer

This is the videotaped deposition of
DAVID RICKETTS, PH.D., taken pursuant to Notice
of the parties before Lisa A. Wheeler, RPR, CRR,
in the offices of Womble Bond Dickinson (US), 555
Fayetteville Street, Suite 1100, Raleigh, North
Carolina, on the 3rd day of November, 2025,
beginning at 9:59 a.m.

The reading and signing of this
transcript is reserved.

I N D E X

PAGE

EXAMINATION BY MR. DAY

5

E X H I B I T S
(NO EXHIBITS MARKED)

(REPORTER NOTE: Quoted material, if any, is
reproduced as read or quoted by the speaker.)

P R O C E E D I N G S

* * * *

THE VIDEOGRAPHER: We are now on the record. Today's date is November 3rd, 2025, and the time is 9:59. My name is Carl Riehl. The court reporter is Lisa Wheeler. We are here on behalf of Cite Court Reporting of Montgomery, Alabama.

This is the video deposition of Dr. David Ricketts in the matter of MediaTek, Inc., Petitioner, versus ParkerVision, Inc., Patent Owner, in the U.S. Patent and Trademark Office before the Patent Trial and Appeal Board, IPR2025-00030.

Would counsel now please identify yourselves for the record.

MR. DAY: Evan Day from Perkins Coie, LLP, San Diego office for petitioner, MediaTek, Inc.

MR. TO: Anderson To from the law firm Daignault Iyer for patent owner, ParkerVision.

THE VIDEOGRAPHER: And would the court reporter please swear in the witness.

* * * *

Whereupon,

1 DAVID RICKETTS, PH.D.,
2 having been first duly sworn by the certified
3 stenographic court reporter, was examined and
4 testified as follows:

5 THE REPORTER: Thank you.

6 EXAMINATION

7 BY MR. DAY:

8 Q. Good morning, Dr. Ricketts.

9 A. Good morning.

10 Q. We have met before, right?

11 A. Yes, we have.

12 Q. And I assume you've been deposed on a
13 few occasions before?

14 A. Yes, I have.

15 Q. And usually, at the start of a
16 deposition, I will go through the procedure for a
17 deposition. Since I assume you're fairly
18 familiar with it, I'll dispense with most of it
19 and just reiterate -- reiterate a couple of, I
20 think, sort of the key points that tend to come
21 up.

22 A. Sure.

23 Q. When -- when I'm asking questions, I --
24 I want to make sure we avoid cross-talk so
25 I'll -- I'll ask questions. Make sure you wait

1 for me to finish. Then when -- when you respond,
2 I'll do my best to wait for you to finish your
3 answer so we have a clean record for the court
4 reporter.

5 Similarly, if -- if I ask you a
6 question, please verbalize your response since
7 the court reporter's not necessarily capturing
8 all the -- the head nods and head shakes and
9 things like that.

10 Do you understand those instructions?

11 A. I do understand.

12 Q. And your -- your counsel may object.
13 As always, unless you're instructed not to answer
14 a question, even if your counsel objects, you
15 should still answer.

16 Do you understand that?

17 A. I do understand.

18 Q. We will take breaks periodically. I
19 don't expect this deposition to be particularly
20 lengthy, but we'll still have -- still probably
21 go long enough to take a few breaks. Typically,
22 I'll go about every hour. If you need to take a
23 break for any reason, please just let me know.
24 One caution about breaks, though, is that we
25 will -- except in some very rare circumstances,

1 we usually will not take a break when there is a
2 pending question. And I'll also ask you not to
3 discuss the substance of your testimony with
4 counsel during the breaks.

5 Do you understand that?

6 A. I understand.

7 Q. And do you have some documents sitting
8 in front of you?

9 A. Yes, I do.

10 Q. And can you identify those for the
11 record.

12 A. Yes, I can. I have my declaration,
13 which is Exhibit 2001. I also have Dr. Larson's
14 declaration, which is Exhibit 1003. I have the
15 petition by the petitioner. I don't know what
16 exhibit that is, but I also have the patent
17 owner's response to the petition. And then I
18 have exhibits, and I'll read them out. The
19 patent, 1001. Then I have Exhibit 1007, 1008,
20 1009, 1011, 1012, and 1013 and 1005.

21 Q. Are there any annotations or marks on
22 any of those exhibits?

23 A. There are not. Just so you're aware, I
24 pulled out of the petition -- there was a table
25 of claims so I just like to have the claims.

1 These are just a listing of the claims that I
2 just pulled out separately, but they're from that
3 same document.

4 Q. Now, one of those exhibits is your
5 declaration, Exhibit 2001.

6 A. Yes, sir.

7 Q. Before you prepared that -- that
8 declaration, did you review any material that's
9 not listed in that declaration?

10 A. Not that I recall.

11 Q. Did you speak to the named inventors on
12 the -- the '593 patent?

13 A. I did not speak to the inventors on the
14 '593 patent.

15 Q. Did you review any of the other
16 ParkerVision patent documents that are cited
17 within the '593 patent?

18 A. Yes, I did. I think in the patent
19 there's references to some applications and some
20 prior applications. And then also, I believe the
21 '704 was listed in the petition and so I reviewed
22 that, the '704 being a -- a related patent.

23 Q. Now, are you aware that the '593 patent
24 is also asserted in a District Court litigation?

25 A. Yes, I am.

1 MR. TO: Object- -- objection, scope.

2 BY MR. DAY:

3 Q. Did you provide any testimony relating
4 to the claim construction of the '593 patent in
5 the District Court case?

6 MR. TO: Objection, scope.

7 A. Not that I recall.

8 Q. Prior to submitting your declaration in
9 this IPR, did you review any of ParkerVision's
10 claim construction filings regarding the '593
11 patent in the District Court case?

12 MR. TO: Objection, scope, form.

13 A. I don't recall reviewing them. Just to
14 clarify, I don't recall reviewing them before. I
15 have reviewed them since.

16 Q. Okay. So to -- to make sure I -- I
17 have a clear answer there, prior to the time that
18 you provided your declaration in this IPR, you
19 had not -- you cannot recall reviewing any of the
20 claim construction filings in the District Court
21 case; is that correct?

22 A. With re- -- just --

23 MR. TO: Sorry.

24 A. With re- --

25 MR. TO: Sorry. If you allow me to --

1 to object before you answer. Same objections.

2 A. Just to clarify with respect to the
3 '593, I did not -- I don't recall reviewing any
4 claim construction arguments in the District
5 Court case.

6 Q. Now, you said you have reviewed it
7 since?

8 A. Yes.

9 MR. TO: Objection, form.

10 BY MR. DAY:

11 Q. When was that?

12 A. Let's see. What's today? Today is --
13 is it Tuesday already or is it Monday? It's
14 Monday. It would have been in the past week.

15 Q. Would that have been in the course of
16 preparing for this deposition?

17 A. Yes.

18 Q. All right. And I guess that's a
19 logical segue into the -- the next line of
20 questions.

21 What did you do to prepare for this
22 deposition?

23 A. I read my declaration, Dr. Larson's
24 declaration, and I reviewed the exhibits.

25 Q. Did you meet with counsel?

1 A. Yes, I did. I met with counsel on the
2 telephone and then also in person.

3 Q. Was anyone else present during those
4 meetings?

5 A. No, just counsel.

6 Q. Did you speak to anyone else other than
7 counsel to prepare for this deposition?

8 A. I might have spoken to someone about
9 logistics as in, like, where's it going to take
10 place but nothing substantive.

11 Q. In the course of preparing for this
12 deposition, did you review any other documents
13 besides those that are cited in your declaration?

14 MR. TO: Objection, form.

15 A. Other than those cited and -- I believe
16 Page 4 I have materials considered so those would
17 be either -- materials considered -- if there's
18 something cited that's not materials considered,
19 then I -- I would have obviously read that had I
20 cited.

21 Q. So maybe I'll rephrase that question.
22 Did you review any materials to prepare for this
23 deposition other than those that are listed in
24 your declaration?

25 MR. TO: Objection, form.

1 A. I think the only -- no, except for we
2 just spoke I did review what I understand was the
3 preliminary claim constructions for the District
4 Court case. That would be the only other
5 document that may not be listed in here.

6 Q. Okay. And maybe I should actually
7 clarify that. You said you reviewed the
8 preliminary claim constructions for the District
9 Court case. I should maybe get -- get clar- --
10 clarity on exactly what you reviewed.

11 When you say you reviewed the
12 preliminary claim constructions, what type of
13 document was that?

14 MR. TO: Objection, form, scope.

15 A. Just for clarity, there was a table
16 that listed both parties' proposed constructions.
17 There was a third column. I don't know what the
18 legal status of that was, but my understanding
19 was that some of those terms have been either --
20 decided preliminarily. And so that was from the
21 court. It was provided to me through counsel.

22 Q. All right. Did you review any of
23 the -- the parties' claim construction briefs
24 with respect to the '593 patent?

25 A. No, I did not.

1 Q. And that would be the same answer
2 either for your declaration or prior to this
3 deposition?

4 A. I didn't -- just for --

5 MR. TO: Objection, form.

6 A. -- for clarity, I did not review any of
7 the claim construction briefs in the District
8 Court case for the '593 prior -- in preparation
9 for my deposition.

10 Q. Okay. And you also did not review any
11 of the claim construction briefs in the District
12 Court case prior to providing your declaration;
13 is that right?

14 MR. TO: Same objection.

15 A. That is correct.

16 Q. All right. And you have the -- the
17 '593 patent in front of you?

18 A. Yes, I do.

19 Q. And if you can turn to the last page
20 that has the claims. Since there are -- there
21 are some somewhat lengthy claim terms in the
22 claims of the '593 patent, there are a couple
23 that I'd like to address just to see if we can
24 agree on a shorthand so we don't have to repeat
25 the -- the whole long language of the claim.

1 So I'm going to direct your attention
2 to claim 1 and starting at the -- starting at
3 Line 21 in Column 11 there's a phrase, in
4 response to a power efficiency of the power
5 supply exceeding a predetermined threshold.

6 Do you see that?

7 A. Yes, I do.

8 Q. Would you be comfortable referring to
9 that language as the -- the threshold limitation?

10 A. Just for clarity, if we could refer to
11 it as the efficiency threshold limitation, then I
12 think that would be specific enough. I would
13 know.

14 Q. Okay. So you -- you prefer using
15 efficiency threshold rather than just threshold?

16 A. Yeah, just for clarity.

17 Q. Okay. And then following that
18 language, the rest of the -- the rest of the
19 claim continues, the aperture generator and
20 control module deactivates the switching device
21 and passes the input voltage to the output
22 voltage node.

23 Do you see that?

24 A. I do.

25 Q. Would you be comfortable referring to

1 that language as the bypass limitation?

2 A. I think that would be fine. If I think
3 it's ambiguous, I'll just clarify, but I'll
4 understand that portion of the claim as the
5 bypass configuration.

6 Q. Yeah. And sure. That's fine. If --
7 like, if it needs to be clarified for the purpose
8 of any question --

9 A. Sure.

10 Q. -- then -- then, obviously, we don't --
11 we don't need to use it every time, but just
12 for -- for purposes of efficiency we'll use it
13 where -- where we can.

14 And do you see also in -- that claims 9
15 and 15 both have similar language to the --
16 the -- the elements we've just discussed as the
17 efficiency threshold limitation and the bypass
18 limitation?

19 MR. TO: Objection, form.

20 A. I do see they have similar -- just
21 maybe for clarity, we can just list out once the
22 column and line numbers so that it -- it's clear.

23 Q. Okay. Sure. So in claim 9 you see, in
24 response to the power efficiency of the power
25 supply exceeding a predetermined threshold.

1 Do you see that?

2 A. I do in Column 12, Line 1 and 2.

3 Q. And that would be the instance in claim
4 9 of what we refer to as the efficiency --
5 efficiency threshold limitation, right?

6 A. I understand that.

7 MR. TO: Objection, form.

8 BY MR. DAY:

9 Q. And then that's followed by,
10 de-activating the switching device and passing
11 the input voltage to the output voltage node.

12 Do you see that?

13 A. Column 12, Lines 2 through 4, yes, I do
14 see that.

15 Q. And that would be the -- what we refer
16 to as the bypass limitation, right?

17 MR. TO: Objection, form.

18 A. I understand that that's referring to
19 the bypass configuration.

20 Q. And then in Column 15, Lines -- or,
21 excuse me, not -- not Column 15. Column 12,
22 Lines 34 through 36 in claim 15, do you see the
23 claim language, in response to a power efficiency
24 of the power supply exceeding a predetermined
25 threshold?

1 A. Yes, I do.

2 Q. And are you comfortable referring to
3 that language using the same efficiency threshold
4 shorthand that we just discussed?

5 A. Yes.

6 MR. TO: Objection, form.

7 A. Yes, I am.

8 Q. And that's followed in Column 12, Lines
9 36 through 38 by, the aperture generator and
10 control module deactivates the switching device
11 and passes the input voltage to the output
12 voltage node.

13 Do you see that?

14 A. I do.

15 Q. And are you comfortable referring to
16 that claim element by the -- the bypass element
17 shorthand that we've been discussing?

18 MR. TO: Objection, form.

19 A. I'll -- I'll understand that as the
20 bypass function.

21 Q. So it would be fair to say that a -- a
22 fair amount of the discussion from -- from both
23 sides in your declaration has revolved around the
24 term power efficiency; is that right?

25 MR. TO: Objection, form.

1 A. I think power efficiency is a -- a key
2 term in the claims and in the specification.

3 Q. Is power efficiency a -- a term of art?

4 MR. TO: Objection, form.

5 A. Yes, it generally is a term of art.
6 It's often placed in a context, but generally,
7 power efficiency's understood.

8 Q. Does the '593 patent propose any sort
9 of special definition for the term power
10 efficiency?

11 MR. TO: Objection, form.

12 A. The '593, just as example in Column 4,
13 Lines 45 through 58 uses it in the common
14 terminology as a percentage. So they discuss
15 power efficiency of amplifiers, power
16 efficiencies of supplies as percentages, and then
17 it's common when you cascade them to multiply it.
18 So I think that's consistent with a POSITA's
19 understanding of power efficiency.

20 Q. Okay. And -- and maybe I'll restate
21 the question a little bit. So, I mean, I think
22 I -- I -- I mean, I think you -- you've been a --
23 an expert witness in a number of patent cases,
24 right?

25 A. That's correct.

1 Q. And -- and you're familiar with the
2 concept of -- of inventors' lexicography in the
3 context of claim construction?

4 A. I am aware of that concept, yes.

5 Q. The idea that -- that an -- an inventor
6 in a patent might redefine a term or give a
7 special definition to a term?

8 MR. TO: Objection, form.

9 A. In some instances, I understand that
10 could be the case. My understanding that's not
11 the case in this patent, but I understand the
12 concept.

13 Q. Thanks. And you anticipated my next
14 question.

15 So to -- to clarify, what I'm asking,
16 you're not taking the position that there's any
17 special definition or lexicography given to the
18 term power efficiency in the '593 patent; is that
19 right?

20 MR. TO: Objection, calls for a legal
21 conclusion.

22 A. From a technical standpoint, the power
23 efficiency that's listed here is the -- the
24 patent specifies whether it's power efficiency
25 for the power amplifier or for the DC-to-DC

1 converter, and it's used in the normal way of a
2 percentage of, for instance, power out over power
3 in.

4 Q. What values would you need to know to
5 determine power efficiency?

6 MR. TO: Objection, form.

7 A. Once again, you just need to know the
8 context. Is it, for instance, the DC-to-DC
9 supply or the power amplifier? And then the
10 power efficiency in general for a power supply is
11 the output power divided by the input power.

12 Q. What values would you need to know to
13 calculate the output power?

14 MR. TO: Objection, form.

15 A. The output power, in general, if you
16 had the time series of the voltage and the time
17 series of the current, you could use those to
18 calculate the output power, both instantaneous
19 and average, or any other quantity of the power
20 effic- -- power out that you wanted.

21 Q. So it -- for example, in a DC circuit,
22 the instantaneous power could be calculated as
23 the -- the current times the voltage; is that
24 right?

25 MR. TO: Objection, form.

1 A. As a separate note, just in fundamental
2 electronics, if you have a DC source, you can
3 calculate power as the voltage times the current
4 from the DC source. But if you're in an actual
5 circuit, the voltages vary, the currents vary,
6 and you have to use both of them together in a
7 time series to get the actual power.

8 Q. Is the voltage -- is the output voltage
9 alone sufficient to -- to calculate the power?

10 MR. TO: Objection, form.

11 A. The output voltage coupled with
12 additional information could be used to calculate
13 the power. If you knew how the current related
14 to the voltage, then you could basically
15 calculate the current from the voltage and then
16 you have voltage and current and then you could
17 use those two to find the power.

18 Q. So I -- I think you started your answer
19 with the phrase output voltage coupled with
20 additional information.

21 If you had the output voltage alone
22 with no additional information, would that be
23 sufficient to identify the output power?

24 MR. TO: Objection, form.

25 A. If you just had a single number as

1 voltage with no other information, implied or
2 otherwise, then you would just have a voltage.
3 You couldn't calculate power without having
4 additional information.

5 Q. Can power also be calculated by the
6 voltage drop across a -- a known resistor?

7 MR. TO: Objection, form.

8 A. In undergraduate electronics we teach
9 students how to calculate the power in a
10 resistor, which can be calculated from the
11 voltage and the current.

12 Q. Now, with respect to the -- the input
13 power, would you also need to require additional
14 information besides the voltage to calculate
15 input power?

16 MR. TO: Objection, form.

17 A. Just -- just for clarity, in all of
18 these previous answers we've been discussing a
19 DC-to-DC power supply, not a power amplifier.
20 Just wanted to clarify that.

21 To measure the input power to a power
22 supply, if you just had a voltage and knew
23 nothing else, implied or otherwise, it would just
24 be a single number. You'd need to know something
25 about the currents to be able to calculate the

1 power.

2 Q. Would input voltage and current from
3 a -- a DC source such as a battery be sufficient
4 to determine input power?

5 MR. TO: Objection, form.

6 A. If you had the time series of the
7 voltage and of the current, you could use those
8 two to calculate the -- the power and if they
9 were the input voltage and input current, you
10 could use those to calculate the input power of a
11 DC-to-DC converter.

12 Q. How is -- what units are typically used
13 to indicate power?

14 MR. TO: Objection, form.

15 A. Watts.

16 Q. Can power also be expressed in -- in
17 dBm for decibel milliwatts?

18 MR. TO: Objection, form.

19 A. So just for clarity, previously, we
20 were talking about DC-to-DC power supplies. If
21 we talk about power supplies, DC-to-DC, I've not
22 heard anyone reference power as dBm. DBm is
23 decibels with respect to one milliwatt of RF
24 power. So the output power or input power of a
25 RF amplifier could be measured in dBm, but that

1 has the reference of a ratio to one milliwatt of
2 RF power.

3 Q. And dBm is on a logarithmic scale; is
4 that right?

5 A. Yes, the decibel is a -- on a
6 logarithmic scale.

7 Q. So it -- what -- what is a zero dBm in
8 watts?

9 A. So dBm is defined by the field and so
10 zero dBm would mean one milliwatt.

11 Q. Because dBm is expressed well --
12 relative to milliwatts, dBm can be converted to a
13 scale of -- of milliwatts or watts; is that
14 right?

15 MR. TO: Objection, form.

16 A. There is a mathematical conversion
17 between the two, yes.

18 Q. Is that mathematic -- the mathematical
19 conversion basically every factor of ten
20 milliwatts corresponds to ten dBm?

21 MR. TO: Objection --

22 BY MR. DAY:

23 Q. Is that right?

24 MR. TO: -- form.

25 A. Every multiple of ten. So if you

1 multiply one milliwatt by ten, you have ten dB.
2 If you multiply that by ten again, you go to 20
3 dB. It's just converting decibels to -- to
4 linear.

5 Q. All right. So if you -- if the power
6 expressed in -- if an output power was expressed
7 in dBm, that could also give you a known output
8 power in milliwatts; is that right?

9 MR. TO: Objection, form.

10 A. If a RF, so radiofrequency, signal
11 output -- if we were given that in dBm, you could
12 convert that to watts. It would be just the
13 conversion from decibels to watts.

14 Q. And if you had a known output -- excuse
15 me. I'll -- I'll start again.

16 If you had a known output power in dBm
17 and a known input voltage and current, that would
18 be enough information to calculate power
19 efficiency, right?

20 MR. TO: Objection, form.

21 A. So we'd have to specify power
22 efficiency in the context. So in a DC-to-DC
23 converter, it's power out over power in. For an
24 RF amplifier, it can be the output power over the
25 input power. It can also be the output power

1 over the total consumed power. There's a --
2 power added efficiency is a term in the art and
3 then there's drain efficiency. Those are two
4 specific versions of power efficiency for power
5 amplifiers.

6 Q. Okay. Let's talk about some of those
7 terms. You also mentioned total consumed power.
8 How does one measure the power consumed in an
9 amplifier?

10 MR. TO: Objection, form.

11 A. So I should clarify consumed power. So
12 if you -- in a radiofrequency power amplifier,
13 you have a RF power out and then you have power
14 flowing into the amplifier from RF in and then
15 you have power flowing from the supply voltage.
16 So when I said, power consumed, in that instance,
17 I was considering the supply power of the P- --
18 power amplifier.

19 THE VIDEOGRAPHER: Counsel, can we take
20 a minute break? I have a little issue here with
21 my camera.

22 MR. DAY: Sure. We'll, yeah, just take
23 an in-place recess.

24 THE VIDEOGRAPHER: Off the record at
25 10:25.

1 (Whereupon, there was a recess in the
2 proceedings from 10:25 a.m. to 10:27 a.m.)

3 THE VIDEOGRAPHER: Back on the record
4 at 10:27.

5 BY MR. DAY:

6 Q. Okay. I want -- want to go back to
7 your last answer. You said power consumed was
8 considering the supply power of the power
9 amplifier.

10 What is the supply power of a power
11 amplifier?

12 MR. TO: Objection, form.

13 A. In general, a power amplifier has a
14 supply voltage that provides the bias at which
15 the power amplifier operates so it would be
16 sometimes called Vcc, but it's the supply of
17 the -- supplying the energy to the power
18 amplifier.

19 Q. Okay. So the power consumption of a
20 power amplifier would be a reference to the power
21 being supplied to the -- the power amplifier
22 rather than the power output of the amplifier; is
23 that right?

24 MR. TO: Objection, form.

25 A. Just for clarity, it's the power

1 entering the power amplifier from the supply.
2 That is what it -- the DC con- -- consumption of
3 current and that is different than the RF output
4 power.

5 Q. Okay. And -- and the con- -- yeah.
6 Maybe I'll clarify again since you asked to
7 clarify there. So I'll -- I'll -- I'll start
8 again.

9 The power consumption of a power
10 amplifier would refer to the power entering the
11 power amplifier from the supply; is that right?

12 MR. TO: Objection, form, asked and
13 answered.

14 A. That is correct.

15 Q. Okay. And I think a few questions ago,
16 you referred to two different ways of measuring
17 power efficiency for an amplifier. You also
18 discussed drain efficiency.

19 What is drain efficiency?

20 MR. TO: Objection, form,
21 mischaracterizes.

22 A. Drain efficiency is the output RF power
23 typ- -- typically divided by the DC current
24 consumed by the power amplifier so the power
25 coming into it from its supply.

1 Q. Have you ever designed a switching
2 power supply in your career?

3 MR. TO: Objection, form, scope.

4 A. Yes, dozens.

5 Q. Is a switching power supply also --
6 actually, I'll -- I'll start again.

7 Would those include down-converting
8 switching power supplies?

9 MR. TO: Same objections.

10 A. Yes. I was in charge of an engineering
11 research department at ON Semiconductor, and we
12 built buck converters, which are the stepdown
13 converters.

14 Q. Yeah. Again, you anticipated my next
15 question.

16 The buck converter is a common
17 terminology for a stepdown converter; is that
18 right?

19 A. Yes, sir. In the class of DC-to-DC
20 converters, a buck converter is known as one that
21 reduces the voltage from a higher voltage to a
22 lower.

23 Q. Have you ever designed a power supply
24 with a bypass function?

25 MR. TO: Objection, form, scope.

1 A. I would have to look back at my
2 designs, but in my work at American Power
3 Conversion, I believe, yes, we had bypass
4 switches for the power supplies. Those were
5 uninterruptible power supplies or UPSs.

6 Q. What is an un- -- uninterruptible power
7 supply?

8 MR. TO: Same objections.

9 A. We used to see them next to our
10 computers. You'd plug your computer into it so
11 when the power went out, it would keep your
12 computer running so it didn't lose all your data
13 and so they have a AC-to-DC and a DC-to-AC power
14 converter inside of it.

15 Q. And how would that -- how would the
16 bypass switch figure into that -- that type of
17 supply?

18 MR. TO: Same objections.

19 A. Depending upon the input voltage and
20 the converters, you sometimes would feed the
21 input directly to the output. Most common would
22 be if the voltage from the wall outlet was good,
23 you'd connect that directly to the AC outlets on
24 the device.

25 Q. Have you ever designed a power supply

1 that would -- had a bypass function to bypass a
2 buck converter?

3 MR. TO: Objection, form, scope.

4 A. Not that I could recall sitting here.

5 Q. Can you recall being familiar with any
6 power supply with a bypass function to bypass a
7 buck converter prior to being retained by
8 ParkerVision?

9 MR. TO: Objection, form, scope.

10 A. I can't think of a specific example,
11 but like I said, I've designed dozens in my
12 career.

13 Q. You gave a definition of a person of
14 ordinary skill in the art at your declaration
15 in -- in Paragraph 25. I'll give you a moment to
16 find that.

17 A. I am there.

18 Q. So you offered the opinion in Paragraph
19 25 that, a person of ordinary skill in the art at
20 the time of the invention of the '593 patent
21 would have: a Bachelor of Science in electrical
22 or computer engineering (or a related academic
23 field), and at least two additional years of work
24 experience in the design and development of radio
25 frequency circuits and/or systems, or at least

1 five years of work experience and training in the
2 design and development of radio frequency
3 circuits and/or systems.

4 Did I read that correctly?

5 A. Yes, you read that correctly.

6 Q. I -- I just wanted to ask a couple of
7 questions about the or computer engineering
8 portion of -- of -- of that definition.

9 In your experience, would you expect a
10 computer engineering course to -- to give a
11 graduate -- or I'll start again.

12 Would you expect a typical computer
13 engineering course to include coursework in RF
14 systems?

15 MR. TO: Objection, form.

16 A. So in most universities for the past
17 several decades, electrical and computer
18 engineering are formed together so they take the
19 same fundamental classes. They get the same
20 basic experience. They specialize in a few
21 classes that are different. So I think they
22 would have the same foundational knowledge for
23 that, and then added to that is two additional
24 years of work experience in radiofrequency
25 circuits.

1 Q. So what -- when you were defining a
2 person of ordinary skill in the art as someone
3 with electrical or computer engineering
4 experience, are you -- I'll start again.

5 When -- when you're saying a person of
6 ordinary -- of ordinary skill in the art would
7 have a bachelor of science degree in electrical
8 or computer engineering, would you assume that if
9 that person just had a degree in computer
10 engineering that they would have had coursework
11 in RF circuits?

12 MR. TO: Objection, form.

13 A. They certainly would have had
14 coursework in all the same fundamentals as
15 someone getting an electrical engineering degree,
16 and those fundamentals include some discussion of
17 RF circuits so they'd have the same fundamentals.

18 Q. Is there any difference between
19 computer engineering and computer science?

20 A. Yes, there is.

21 Q. What is the difference?

22 A. Computer engineering relates, in
23 general, to the hardware that does the computing
24 so students learn all about voltage, current,
25 transistors, circuits, microprocessors, and how

1 they're used to build computers.

2 Q. Would a computer science degree alone
3 be sufficient for the education portion of your
4 definition of a person in or- -- of ordinary
5 skill in the art?

6 MR. TO: Objection, form.

7 A. I've listed a degree in electrical or
8 computer engineering so those are the two that I
9 put forward in my definition.

10 Q. Would it be fair to say that the -- the
11 reason you've listed those two is because of
12 the -- there would be some degree of education
13 needed in the -- in the hardware components of a
14 computing system including DC and AC power
15 supplies?

16 MR. TO: Objection, form.

17 A. I think certainly a POSITA would need a
18 fundamental understanding of basic circuits,
19 voltage, current, power, that kind of thing, yes.

20 Q. And I want to come back to the
21 discussion we're -- we were just having about --
22 about power efficiency.

23 Why is optimizing power efficiency
24 important in a battery-powered device?

25 MR. TO: Objection, form.

1 A. So power efficiency -- I -- I think a
2 POSITA would understand low power efficiency, for
3 instance, to provide several problems. One would
4 be higher currents that may damage devices. One
5 would be thermal, generates more heat so that
6 thermal might be a problem. And then also, for a
7 given output power of the system, which we
8 haven't quite defined here, you'd need more input
9 power if it was lower efficiency.

10 Q. Would a -- a higher current draw from a
11 battery potentially result in lower battery life?

12 MR. TO: Objection, form.

13 A. I don't believe that's addressed
14 anywhere in my -- my declaration about battery
15 life.

16 Q. Well, I mean, I -- I -- I'll start
17 again.

18 A typical -- a typical consumer device
19 such as a cell phone are -- they're very
20 frequently powered by lithium-ion batteries; is
21 that right?

22 A. That's my understanding.

23 MR. TO: Objection, form, scope.

24 BY MR. DAY:

25 Q. And a common lithium-ion battery in a

1 device such as a cell phone would typically
2 maintain a near-constant voltage throughout most
3 of the life of the battery; is that right?

4 MR. TO: Objection, form, scope.

5 A. No. I would -- I would disagree.
6 Lithium-ion batteries will change the voltage as
7 their energy's depleted within a range specified
8 by the manufacturer.

9 Q. Will the -- the volt- -- will the
10 voltage change only as the -- the battery is
11 nearing depletion?

12 MR. TO: Objection, form, scope.

13 A. The voltage change of the battery is
14 typically nonlinear, but it varies from when you
15 start taking charge out till when the battery's
16 fully depleted.

17 Q. How great is that variation?

18 MR. TO: Same objections.

19 A. I haven't quantified it in -- in my
20 report. Battery literature would -- I would
21 state that for a lithium-ion battery -- off the
22 top of my head, I don't have a number to give
23 you, but it would be certainly in the order of
24 hundreds of millivolts to perhaps over a volt.

25 Q. Would it be fair to say that the -- the

1 greater the current being drawn out of a -- a
2 battery, the -- the faster the battery will be
3 depleted?

4 MR. TO: Objection, form, scope.

5 A. So a battery is sort of a -- a storage
6 of charge and so current is taking so much charge
7 per second. So if you take more charge per
8 second, you're depleting the battery faster so
9 the voltage would reduce for two reasons: One,
10 it's becoming depleted and, two, a higher current
11 usually results in a higher resistance in the
12 battery so the voltage drops even further.

13 Q. I want to direct your attention to
14 claim 1 of the -- the '593 patent. Now, do you
15 see that the first line of claim 1 refers to an
16 RF power amplifier system? Oh, sorry. I'm
17 looking at the wrong claim. My apologies. I'll
18 restate it. I thought that wasn't right.

19 The -- the first line of claim 1 refers
20 to a power supply; is that right?

21 A. That's correct.

22 Q. Does the power supply in claim 1 need
23 to calc- -- need to calculate power efficiency in
24 order to practice claim 1 of the '593 patent?

25 MR. TO: Objection, form.

1 A. Claim 1 requires determining a
2 predetermined threshold so that predetermined
3 threshold can be determined before -- doesn't
4 need to be computed by the power supply. It
5 could be a -- a known predetermined threshold
6 from an analysis of the system.

7 Q. Okay. So that does need to be computed
8 by the power supply. Does the -- so I guess the
9 answer to my question is, no, the power supply
10 itself does not need to compute the predetermined
11 threshold of power efficiency; is that right?

12 MR. TO: Objection, form, asked and
13 answered, miscate- -- mischaracterizes.

14 A. Perhaps I'll just restate my answer.
15 Claim 1 requires a power supply and that power
16 supply uses a predetermined threshold. That
17 predetermined threshold does not need to be
18 calculated by the power supply hardware. It
19 could be calculated a priori and determined from
20 system information known about the power supply
21 so that could be done separate from the power
22 supply hardware and before its usage or during
23 its usage.

24 Q. Does the power supply itself need to
25 have sufficient information to be able to

1 calculate the power efficiency?

2 MR. TO: Objection, form.

3 A. The -- sufficient information needs to
4 be available to determine the power efficiency
5 and determine a predetermined threshold so you
6 need sufficient information for that. So if you
7 have that information, you can determine
8 efficiencies and you can also determine
9 thresholds.

10 Q. My question was about whether the
11 information you just discussed needs to be
12 available to the power supply itself.

13 MR. TO: Objection, form.

14 A. With respect to the physical hardware,
15 does the hardware have to have in the volts and
16 currents running around the circuit that
17 information? Only in that it needs to have a
18 predetermined threshold, but the information to
19 determine that threshold doesn't need to come
20 from the power supply hardware while it's
21 operating. It could come from a prior analysis
22 of the power supply, for instance.

23 Q. So in your opinion, a power supply
24 could practice claim 1 of the '593 patent even
25 without directly measuring power efficiency at

1 run time; is that right?

2 MR. TO: Objection, form,
3 mischaracterizes.

4 A. That is not correct with the -- my
5 previous answer. And just to clarify, if one was
6 to know the efficiency and the operation of the
7 power supply, for instance, through testing and
8 modeling and know all of that, one could
9 determine the power efficiency and also the
10 threshold and that could be done before the power
11 supply is put into operation in its -- its
12 application, for instance.

13 Q. So if one was, I think, as you put it,
14 to know the efficiency and the operation of the
15 power supply through -- through testing and
16 modeling, all of that -- and -- and all of that,
17 would the power supply itself actually need to
18 measure power efficiency at run time?

19 MR. TO: Objection, form.

20 A. For clarity, I'm understanding at run
21 time to mean when you're operating it in, like,
22 the end product. Is that a correct --

23 Q. Correct.

24 A. -- understanding?

25 The -- a power supply needs to have a

1 predetermined threshold so that's all that's
2 required so it can operate in its application as
3 long as it has that predetermined threshold,
4 which could be determined prior to it being
5 started up in its application.

6 Q. Does that predetermined threshold
7 itself need to be efficiency?

8 MR. TO: Objection, form.

9 A. That predetermined threshold needs to
10 be -- the -- we're talking about a predetermined
11 threshold here relating to power efficiency of
12 the power supply so that threshold relates to the
13 power efficiency of the power supply so that
14 certainly involves power efficiency.

15 Q. Can the threshold that is assessed at
16 run time -- I'll start again.

17 Could the threshold that's assessed at
18 run time be a -- an indicator such as voltage?

19 MR. TO: Objection, form.

20 A. I would say that is not correct, but to
21 provide a little clarification, the threshold can
22 be predetermined from the efficiency
23 understanding and communication waveform,
24 distributions, et cetera. And once that
25 threshold is understood, that can be represented

1 by a signal and the signal could be a voltage or
2 the signal could be a current, but the threshold
3 is really from the power efficiency
4 understanding.

5 Q. Okay. I see. So the -- the
6 threshold -- you said the threshold could be
7 represented by a signal which could be a voltage
8 or a current; is that right?

9 MR. TO: Objection, form,
10 mischaracterizes.

11 A. In the power supply that predetermined
12 threshold that's calculated or understood from
13 the power efficiency, the -- the circuit operates
14 on a voltage or a current so that signal needs to
15 be sent as a threshold and that could be a
16 voltage based on the efficiency information,
17 could be a current based on the efficiency
18 information. When I -- just to be clear, I'm
19 talking about an input signal. Like I have a box
20 with a terminal and that terminal could either be
21 driven as a voltage or as a current, not
22 measuring voltages and currents inside the box
23 but just looking at the input.

24 Q. All right. Can you turn to Figure 4 of
25 the '593 patent. And I assume you've looked at

1 Figure 4 fairly extensively in the course of both
2 preparing your declaration and preparing for this
3 deposition?

4 A. I -- I am familiar with Figure 4.

5 Q. Is Figure 4 an embodiment to a practice
6 of claim 1 in the '593 patent?

7 MR. TO: Objection, scope, form.

8 A. So Figure 4 is a power supply that has
9 a switching device configured to down-convert an
10 input voltage to an output voltage. It has the
11 ability to sense an external threshold so Figure
12 4 could be adapted to claim 1. I think
13 certainly, a POSITA would understand how to use
14 the hardware in Figure 4 to practice claim 1.

15 Q. So would the -- I'll start again.

16 Would having the circuit shown in
17 Figure 4 by itself be sufficient to practice the
18 '593 patent?

19 MR. TO: Objection, form, scope, calls
20 for a legal conclusion.

21 A. The claim 1 requires determining a
22 predetermined threshold related to power
23 efficiency. So just the blocks and rectangles
24 and circuit symbols in Figure 4, the aperture
25 control generator, and the -- the power supply

1 you would need information to understand about
2 its efficiency. Once again, we're just looking
3 at Figure 4 by itself as drawn. So a
4 predetermined threshold needs information about
5 the power efficiency of the power supply.

6 Q. Now, Figure 4 shows an output stage
7 voltage control marked as Number 416.

8 Do you see that?

9 A. I do see 416.

10 Q. And what is the output stage voltage
11 control?

12 A. With respect to Figure 4, the Output
13 Stage Voltage Control signal 416 includes
14 information about the target power supply output
15 voltage and thus allows Bypass Switch Control
16 modulation 402 to determine the value of the
17 power supply output voltage.

18 Q. And were you reading from a portion of
19 the specification there?

20 A. Yes, sir, I was. Column 7, Line 54
21 through, I think, 58.

22 Q. And the circuit that's shown in Figure
23 4 compares that information in the output stage
24 voltage control to a threshold voltage 414; is
25 that right?

1 MR. T0: Objection, form,
2 mischaracterizes.

3 A. I'm sorry. Could you restate the
4 question or repeat the question? I apologize.

5 Q. Maybe I can rephrase it a little bit.
6 You see that the -- the bypass switch control 402
7 has inputs from both the output stage voltage
8 control 416 and the threshold voltage 414?

9 MR. T0: Objection --

10 A. I do --

11 MR. T0: -- form.

12 A. I do see that in Figure 4.

13 Q. And the bypass switch control compares
14 the output stage voltage control to the threshold
15 voltage in order to determine whether to activate
16 the bypass switch; is that right?

17 MR. T0: Objection, form.

18 A. The bypass switch control module 402
19 compares threshold voltage 415 and the value of
20 the power supply output voltage to determine
21 whether power supply 400 should switch to bypass
22 mode. That's Column 7, 59 through 63.

23 Q. Is that comparison based on a
24 determination of power efficiency?

25 MR. T0: Objection, form.

1 A. The sentence that I just read is
2 describing just a comparison of the threshold
3 voltage 14 and an output stage voltage control --
4 actually, it says, Threshold Voltage 14 and the
5 value of the output voltage. So it's just
6 looking at the threshold voltage node 414 and the
7 power supply output voltage.

8 Q. Is that comparison necessarily a
9 determination of power efficiency?

10 MR. TO: Objection, form, asked and
11 answered.

12 A. In the passage I just read, that's a
13 comparison of a voltage on 414 to the output
14 voltage.

15 Q. I still don't believe that answers my
16 question.

17 Does a comparison of an output stage
18 voltage control to a threshold voltage
19 necessarily involve a determination of power
20 efficiency?

21 MR. TO: Objection, form, asked and
22 answered.

23 A. In the description of Figure 4 it's
24 just describing comparing a threshold voltage,
25 which a POSITA would understand is a voltage, and

1 the value of the power supply output to determine
2 whether the switch should be closed in bypass
3 mode. That's what's being described in the
4 Figure 4 paragraph that I read.

5 Q. I still don't believe my question's
6 been answered.

7 The question that I asked you was, does
8 the comparison of an output stage voltage control
9 to a threshold voltage necessarily involve a
10 determination of power efficiency?

11 MR. TO: Objection, form, asked and
12 answered.

13 A. I think we discussed this previously.
14 One could determine a predetermined threshold
15 based upon efficiency and represent that
16 threshold as a voltage and could use the hardware
17 in Figure 4 to control the bypass switch control
18 so it's certainly a possibility. I'm just -- in
19 answering your question, Figure 4 discloses what
20 it discloses and it's just disclosing a threshold
21 voltage 414 being compared to an output voltage.

22 Q. You mentioned that -- well, you said
23 it's a possibility. Let -- let me ask you about
24 this the other way. Is it a possibility that the
25 comparison of a output stage voltage to a

1 threshold voltage would not be a determination of
2 power efficiency?

3 MR. TO: Objection, form.

4 A. The threshold voltage 414, as I said,
5 can be based upon a power efficiency
6 determination. It -- as disclosed in Figure 4,
7 it can just be a threshold voltage, but that's
8 the embodiment, not the claim.

9 Q. So if it's just a threshold voltage,
10 it's not necessarily a determination of power
11 efficiency, right?

12 MR. TO: Objection, form.

13 A. Well, I think, once again, we need to
14 be clear we're talking about an embodiment in
15 Figure 4, not the claims. And so the embodiment
16 in Figure 4 is teaching to use a threshold
17 voltage to control the bypass switch, and claim 1
18 is describing an invention where the
19 predetermined threshold is based upon the power
20 efficiency of the power supply and that certainly
21 is consistent with Figure 4. Figure 4 itself
22 just shows a threshold voltage.

23 Q. And I think my question is, does the
24 comparison of an output voltage to a threshold
25 voltage by itself show a determination of power

1 efficiency?

2 MR. TO: Objection, form, asked and
3 answered.

4 A. Once again, I -- it's -- in Figure 4
5 it's teaching you how you can use a threshold
6 voltage to turn a bypass switch on. That's
7 what's shown in the circuit. A POSITA would
8 understand how to turn the bypass switch on based
9 upon a threshold voltage 414. If the 414 is a
10 predetermined threshold based upon power
11 efficiency, then it would be determining need
12 based upon the power efficiency, which is what
13 the claim speaks of. But 4 -- 4 just teaches the
14 threshold voltage compared to the output.

15 Q. Would it be possible for the circuit
16 shown in Figure 4 to be used without practicing
17 claim 1 of the '593 patent?

18 MR. TO: Objection, form, calls for a
19 legal -- legal conclusion.

20 A. I -- I'm not sure I understand sort of
21 the -- the test for it doesn't practice a claim
22 in the sense here. The -- Figure 4 teaches a set
23 of hardware and that hardware functions as it's
24 described in Figure 4.

25 Q. Would it be necessary for the power

1 efficiency -- I'll start again.

2 Would it be necessary for the power
3 efficiency associated with a particular output
4 voltage to have been predetermined in order for
5 the circuit in -- shown in claim 4 to practice
6 claim 1 of the '593 patent?

7 MR. TO: Objection, form.

8 A. I apologize. If you could break that
9 up into smaller chunks, maybe, for me. I -- I
10 wasn't following at the end the conditions you
11 mentioned at the beginning.

12 Q. All right. So I -- I mean, I think
13 several times in your answers you mentioned
14 something about the power efficiency having been
15 determined at some point, right?

16 MR. TO: Objection, form,
17 mischaracterizes.

18 A. I did discuss power efficiency.

19 Q. And you -- you also talked about having
20 them predetermined, like, for example, at some
21 point in the design process, right?

22 A. I --

23 MR. TO: Objection, form,
24 mischaracterizes.

25 A. I described it being predetermined,

1 meaning the threshold is known, that could
2 have -- for instance, be done before you operate
3 the power supply in a application.

4 Q. Such as during the design process?

5 A. I -- I don't think I said design
6 process. I think I was more just describing that
7 one can characterize the power efficiency and
8 understand the power efficiency of the power
9 supply as it's used in the system and determine a
10 threshold before that, creating a predetermined
11 threshold before it actually operates in an
12 actual system.

13 Q. Would the -- the voltage threshold need
14 to be based on a determined level of power
15 efficiency in order for the system shown in claim
16 4 to practice -- excuse me. Sorry. I'll -- I'll
17 start that again.

18 Would the power efficiency associated
19 with a particular voltage threshold need to have
20 been determined in order for the system that's
21 shown in Figure 4 to practice claim 1 of the '593
22 patent?

23 MR. TO: Objection, form, calls for a
24 legal conclusion.

25 A. I believe that's -- I think that's got

1 it backwards. So you -- you evaluate your power
2 efficiency and then you determine a predetermined
3 threshold, and that threshold can be realized as
4 a voltage, for instance. The voltage is just how
5 they're representing the signal of the threshold
6 and so that can be determined ahead of time.

7 Q. Does a voltage signal necessarily
8 indicate power efficiency?

9 MR. TO: Objection, form, asked and
10 answered.

11 A. I think that question I'm not really
12 clear on what voltage means. I think what I said
13 in the previous answer was, one understanding,
14 power efficiency can set a predetermined
15 threshold and that can be represented as a signal
16 that's a voltage. So if you know your power
17 efficiency and how you determine your
18 predetermined thresholds and get a voltage, then
19 that voltage is just the signal representing your
20 predetermined threshold.

21 Q. So if the signal is just a voltage
22 signal and you never calculated the -- the power
23 efficiency at any point, does that voltage signal
24 necessarily indicate power efficiency?

25 MR. TO: Objection, form, asked and

1 answered.

2 A. In general, does a voltage -- without
3 context to specific system does it indicate
4 efficiency? No, voltage by itself does not.

5 Q. And in the context of Figure 4 of the
6 '593 patent, does the threshold voltage
7 necessarily indicate efficiency?

8 MR. TO: Objection, form.

9 A. When it is based upon efficiency, yes.

10 Q. I think that's more of a tautology than
11 an answer to my question. Does the threshold
12 voltage in Figure 4 of the '593 patent
13 necessarily indicate efficiency?

14 MR. TO: Objection, form, asked and
15 answered.

16 A. Figure 4 teaches how to use a threshold
17 voltage 414 and that's what Figure 4 shows. So
18 414 is a voltage. That voltage is based upon a
19 power efficiency. Then it correlates to that
20 power efficiency that it's based upon.

21 Q. How would you know if the voltage is
22 based upon a power efficiency?

23 A. Because the voltage would be generated
24 from a knowledge of power efficiency so that's
25 where we get the voltage. It would just be the

1 signal coming out. So if you will, you have a --
2 an analysis of power efficiency. From that you
3 determine a predetermined threshold and you say,
4 I need to realize this in a circuit so I need to
5 create a voltage. I know that voltage is related
6 to the analysis I just did. That's how I
7 correlate the two.

8 Q. When you say the voltage is generated
9 from a knowledge of power efficiency, whose
10 knowledge would that be?

11 MR. TO: Objection, form.

12 A. So the -- once again, the concept is
13 you determine a predetermined threshold based
14 upon the power efficiency of the power supply.
15 The power efficiency of the power supply is the
16 power efficiency of the power supply. Based upon
17 that, reading the invention, you determine a
18 threshold -- a predetermined threshold and that
19 has to be realized in a physical form, and a
20 voltage would be a reasonable way to represent
21 that. And Figure 4 shows, if you have a -- a
22 voltage, a method for closing the bypass switch.

23 Q. So I think you said -- and the question
24 I -- the question I just asked you, I asked you
25 about a knowledge of power efficiency and then

1 your answer you used the phrase, you -- you said
2 you a couple times. You determine a threshold
3 and then -- and then, you know, you see the power
4 efficiency of the power supply. Whose knowledge
5 is that that you're talking about?

6 MR. TO: Objection, form,
7 mischaracterizes.

8 A. I think here I'm kind of speaking in a
9 general term of in determining a predetermined
10 threshold, that has to be determined. As the
11 '593 describes, it provides detailed analysis of
12 the power efficiency versus current and voltage
13 and the power amplifier characteristics. Those
14 are all information that a POSITA would
15 understand to use to create a power threshold.

16 Q. Would the designer of the circuit have
17 to have calculated the -- the power efficiency at
18 some point for the threshold voltage to be an
19 indicator of power efficiency?

20 MR. TO: Objection, form.

21 A. I think that for a POSITA to establish
22 a predetermined threshold, they would need to do
23 that ahead of time, predetermined, based upon the
24 power efficiency of the power supply. So I think
25 your question is, do they need to have some

1 information on the power efficiency of the power
2 supply? I -- I would think that would be needed
3 to determine a predetermined threshold.

4 Q. What does the term predetermined in
5 predetermined threshold mean?

6 A. I think a POSITA would understand
7 predetermined to simply mean that it was a input
8 to the system as opposed to a variable in the
9 system that would change continuously, for
10 example.

11 Q. Predetermined -- I'll start again.

12 Would the predetermined threshold mean
13 it -- that threshold would have to be determined
14 prior to the run time of the system?

15 MR. TO: Objection, form.

16 A. Could you restate your question so I
17 have it fresh in my mind?

18 Q. Does the phrase predetermined threshold
19 mean that the threshold would have to be
20 determined prior to the run time of the system?

21 MR. TO: Same objection.

22 A. I think prior to the run time of the
23 system is an example of a predetermined
24 threshold. That predetermined threshold at a
25 later operation could be also predetermined

1 before the next operation.

2 MR. DAY: All right. I think we've
3 been going for a little bit more than an hour.
4 Now be a good time for a break?

5 MR. TO: Yeah.

6 THE VIDEOGRAPHER: Off record at 11:08.
7 (Whereupon, there was a recess in the
8 proceedings from 11:08 a.m. to 11:19 a.m.)

9 THE VIDEOGRAPHER: Back on the record
10 at 11:19.

11 BY MR. DAY:

12 Q. Dr. Ricketts, welcome back.

13 A. Thank you.

14 Q. Did you discuss the substance of your
15 testimony with your counsel during the break?

16 A. I did not.

17 Q. All right. Before we left, we were
18 talking about Figure 4 of the -- the '593 patent.
19 Does the bypass switch control 402 in Figure 4
20 have any input that measures output power?

21 MR. TO: Objection, form.

22 A. The bypass control module 402 receives
23 threshold voltage signal 414 and output sig- --
24 voltage signal 416. Those are the two listed
25 outputs in Column 7, 50 through 53.

1 Q. Does either of those inputs the bypass
2 switch control 402 measure output power?

3 MR. TO: Objection, form.

4 A. The threshold voltage 414 is a voltage
5 and the output stage voltage control 416 is the
6 signal that controls the output voltage.

7 Q. Does either the threshold voltage 414
8 or the output stage voltage control 416 measure
9 output power?

10 MR. TO: Objection, form, asked and
11 answered.

12 A. Both 414 and 416 are inputs to the
13 bypass switch control. The output stage voltage
14 control is the control that the aperture
15 generator uses to create V out so it's -- it's an
16 input to the system.

17 Q. And my question is whether either of
18 the inputs to the bypass switch control 402
19 measure the output power of the power supply.

20 MR. TO: Same objections.

21 A. They're both voltage inputs as control
22 parameters. With additional information, one
23 could derive the output power from the output
24 stage voltage, but 416 itself is just an input
25 control voltage.

1 Q. So 416 itself does not indicate output
2 power without additional information; is that
3 right?

4 MR. TO: Objection, form.

5 A. As it's shown in Figure 14 [sic] it is
6 a voltage input control. With additional
7 information you could understand the output
8 power, but as it's shown in Figure 4, it's just
9 an input voltage control.

10 Q. So the answer to that question is that
11 416 itself would require additional information
12 in order to indicate the output power?

13 MR. TO: Objection, form,
14 mischaracterizes, asked and answered.

15 A. I -- I just want to clarify misspeak.
16 I -- I used the word input because the signal is
17 an input, but it's labeled, Output Stage Control
18 [sic]. So 416 is a voltage input to 402 that
19 represents the output stage voltage control and
20 that is a voltage input. To calculate output
21 power, one would need additional information.

22 Q. Are there any inputs to the bypass
23 switch control shown in Figure 4 that would
24 indicate input power to the power supply?

25 MR. TO: Objection, form.

1 A. The signal 414 is a voltage. That
2 voltage can be a predetermined threshold based
3 upon the power supply efficiency. Power supply
4 efficiency includes in it the input power to a
5 power supply.

6 Q. The question I asked was just about
7 this circuit. Are there any inputs to the bypass
8 switch control 402 that indicate input power?

9 MR. TO: Objection, form, asked and
10 answered.

11 A. So ig- -- ignoring any determinations
12 of efficiency that might be done and
13 characterization, does the threshold voltage
14 signal 414? It -- it's just a voltage signal and
15 unless it's based upon something that relates to
16 the input power such as efficiency, it doesn't
17 indicate the input power.

18 Q. Now, Figure 4 does show an input
19 voltage V in 418; is that right?

20 A. 418 is V_{in} in Figure 4.

21 Q. And 418 is not an input to the bypass
22 switch control 402, correct?

23 A. 418 is not an input to the bypass
24 switch control 402.

25 Q. Can you turn to Column 7 of the '593

1 patent, and I direct your attention starting at
2 Line 50. Would you agree that from approximately
3 Column 7, Line 50 to Column 8, Line 3 there's a
4 description of the bypass function?

5 MR. TO: Objection, form.

6 A. Column 7-50 through Column 8-3
7 describes the bypass switch control module in
8 both paragraphs, 402, along with the other
9 signals, 414, 416, and 400.

10 Q. And Column 7 more specifically at Lines
11 59 through 62 states, the Bypass switch control
12 module 402 compares Threshold Voltage 414 and the
13 value of the power supply output voltage to
14 determine whether power supply 400 should switch
15 to bypass mode.

16 Do you see that?

17 A. I do see that sentence.

18 Q. Is -- does that description in Column 7
19 of the '593 patent describe a -- a determination
20 based on power efficiency?

21 MR. TO: Objection, form.

22 A. So Column 7, 59 through 63 describes
23 what it describes and that the 402 -- the module
24 402 compares two things, threshold voltage 414
25 and the value of the power supply output voltage,

1 to determine whether supply 400 should turn on
2 the switch. That's what 402 does in that
3 sentence.

4 Q. Is the description described -- I'll
5 start again.

6 Is the comparison described at -- at
7 Lines 59 through 62 of Column 7 of -- of the '593
8 patent a comparison of power efficiency?

9 MR. TO: Objection, form.

10 A. It is a comparison of two signals. One
11 is 414, which is represented as a voltage, and
12 the other one is the power supply output voltage.
13 So those are the two signals that are input, are
14 considered by the bypass switch module 402.

15 Q. Does that comparison necessarily
16 indicate power efficiency?

17 MR. TO: Objection, form, asked and
18 answered.

19 A. That comparison, I mean, as it says
20 there in black and white, is comparing two signal
21 voltages. That's what it describes and that's
22 what the function would be understood as.

23 Q. Would it be possible to compare two
24 signal voltages I described in Column 7, Lines 59
25 to 62 of the '593 patent without comparing power

1 efficiency?

2 MR. TO: Objection, form, asked and
3 answered.

4 A. The -- I think we discussed this
5 before. If the voltage on 414 is based upon the
6 power supply efficiency, then it would be based
7 upon the power supply efficiency. 414 -- sorry.
8 Figure 4 is just showing hardware comparing two
9 voltages so one has to look at what those
10 voltages mean to state what the comparison is
11 other than the functional description of
12 comparing two voltages.

13 Q. So just the functional description of
14 comparing two voltages would not be enough to
15 determine whether a circuit practices the
16 bypa- -- bypass element based on power efficiency
17 as recited by claim 1 of the '593 patent,
18 correct?

19 MR. TO: Objection, form --

20 A. The --

21 MR. TO: -- mischaracterizes.

22 A. Well, a POSITA would read the claim,
23 understand what it means, would see Figure 4 as
24 an embodiment. In that embodiment it teaches a
25 function of comparing two voltages and that can

1 be used to -- with a predetermined threshold with
2 a signal that has a voltage so that's certainly
3 possible to do.

4 Q. Is it possible that -- that the
5 comparison of two voltages would not practice
6 claim 1 of the '593 patent?

7 MR. TO: Objection, form, calls for a
8 legal conclusion, asked and answered.

9 A. Once again, looking at claim 1 with
10 respect to determining a predetermined threshold,
11 that's a voltage. That voltage can be used in
12 Figure 4 as a function. Like I said, Figure 4 is
13 just describing the function of the circuit. So
14 you have a voltage. The circuit does what it
15 does.

16 Q. And I -- I don't think I even
17 referenced Figure 4 in my question.

18 Is it po- -- is it possible in any way
19 for the comparison of -- I'll start again.

20 Is it possible for a bypass function
21 based on the comparison of two volt- -- of two
22 voltages to not practice claim 1 of the '593
23 patent?

24 MR. TO: Objection, form, calls for a
25 legal conclusion, asked and answered.

1 A. I mean -- so, I guess, first of all,
2 the references in the paragraph we're talking
3 about are referenced to Figure 4. That's why I
4 referenced that. The functional comparison of
5 two voltages is just the functional comparison of
6 two voltages. One would have to understand what
7 those voltages mean to understand what the system
8 is doing. The function of the block is just the
9 function of the block.

10 Q. So is it your testimony the -- the --
11 the functional -- I'll start again.

12 So the functional comparison of two
13 voltages as you just described it there may or
14 may not practice the claim element of performing
15 a bypass function in response to the power
16 efficiency of the power supply exceeding a
17 predetermined threshold; is that right?

18 MR. TO: Objection, form, ambiguous.

19 A. Just to repeat, the module 402 makes a
20 voltage comparison between two signals. That's
21 the function. That function when one looks at
22 claims needs to be understood in the essence of
23 what those claims are. So claim 1 is a -- is the
24 claim -- a claim we've been looking at and so in
25 this -- in the context of claim 1 where there's a

1 predetermined threshold based upon power supply
2 efficiency, one would understand here's a signal
3 that represents -- or is related to that
4 threshold, but one would have to look at a --
5 if -- I think you asked if there's a claim that
6 doesn't practice. Well, we'd have to look at
7 that claim and see what that claim required.
8 Figure 4 is just teaching the structure that's
9 there.

10 Q. I'm going to direct your attention to
11 the next column of the '593 patent. In Column 8
12 starting at Line 4 the '593 patent says,
13 Accordingly, Bypass Switch Control module 402
14 bypasses the power supply when the output power
15 exceeds a determined threshold, thereby
16 increasing the efficiency of the power supply for
17 output powers exceeding the determined threshold.

18 Do you see that?

19 A. I do see the paragraph you referenced.

20 Q. Does executing a bypass function when
21 the output power exceeds a predetermined
22 threshold satisfy the efficiency threshold
23 element in claim 1 of the '593 patent?

24 MR. TO: Objection, form.

25 A. One would have to look at the

1 efficiency as a function of output power to
2 understand how that efficiency relates. So
3 output power is certainly part of an efficiency
4 consideration so the -- there could be a
5 correlation there, but you'd have to look at
6 power efficiency. That's what the claim
7 requires.

8 Q. So is the answer that output power --
9 I'll start again.

10 A threshold of output power by itself
11 would not necessarily practice the efficiency
12 threshold limitation; is that right?

13 MR. TO: Objection, form.

14 A. The change in output power could be
15 used to determine where you're operating in your
16 power efficiency. Certainly, that's an input to
17 power efficiency so it certainly can be used as
18 part of that.

19 Q. Well, the question that I asked you was
20 whether a output power threshold necessarily
21 indicates power efficiency. Is it possible that
22 a -- a threshold of output power might not
23 indicate power efficiency?

24 MR. TO: Objection, form, compound.

25 A. Well, I think output power's always

1 involved in efficiency so the -- the two have
2 a -- a -- a coupling there. And as I said
3 before, the output power is part of that
4 consideration for efficiency so it can be part of
5 that calculation. You'd have to look at how the
6 predetermined threshold is created and if it's
7 per the claim, then it would practice the claim.

8 Q. Would you need other information
9 besides the output power in order to determine
10 whether the efficiency threshold element was
11 practiced?

12 A. If I had no other information about the
13 system at all so nothing about how Figure 4 works
14 or the PA, just in general, if I just know output
15 power, power efficiency requires knowing input
16 and output power.

17 Q. Can you turn to Figure 5 of the '593
18 patent. Does -- let me know when you're there,
19 please.

20 A. All right. I'm there at Figure 5.

21 Q. Does Figure 5 show an embodiment that
22 would practice claim 1 of the '593 patent?

23 MR. TO: Objection, form, calls for a
24 legal conclusion.

25 A. So Figure 5 contains much the same

1 structure as Figure 4. It adds an optional
2 hysteretic control and an optional load current.
3 If you remove those two, I believe it's identical
4 or almost identical to Figure 4. So claim 1 does
5 not require a hysteresis control and claim 1 does
6 not require an optional load current sensing
7 circuit.

8 Q. All right. Thanks. You anticipated my
9 next question.

10 So you -- you'd agree that -- that
11 neither the optional hysteresis control or the
12 optional load current sensing circuit is
13 necessary to practice claim 1 of the '593 patent?

14 MR. TO: Objection, form, calls for a
15 legal conclusion.

16 A. The claim doesn't refer to any
17 hysteresis control so that would not be required
18 and you could practice claim 1 without an
19 optional load current sensing circuit.

20 Q. How does the optional load current
21 sensing circuit 504 measure current?

22 MR. TO: Objection, form.

23 A. The 593 does not -- as far as I can
24 read in the column, does not provide a specific
25 implementation of a load current sensing. POSITA

1 would be aware of several possibilities for a
2 current load. It does not specify a specific
3 embodiment -- or structure, I should say.

4 Q. So in -- in your opinion, the
5 description of an optional load current sensing
6 circuit in the Box 504 in Figure 5 would be
7 enough description for a POSITA to implement that
8 function; is that right?

9 MR. TO: Objection, form.

10 A. Certainly, a resistor, for instance,
11 can be used to sense currents in series with an
12 output so that's -- a POSITA would -- would know
13 of at least one common structure that could be
14 used to measure current.

15 Q. And what you've just described, a -- a
16 resistor in series with an output, would -- would
17 that also be known as a shunt resistor?

18 A. I -- I think it's similar in nature.
19 It's measuring the current through the voltage
20 across a resistance.

21 Q. Would measuring the current of the
22 voltage across a resistance result in some loss
23 in power?

24 MR. TO: Objection, form.

25 A. In theory, yes, it would always result

1 in some loss in power.

2 Q. Or a shunt -- or -- I'll start again.

3 Were there still circuits that use
4 resistors to measure -- measure current despite
5 that -- that loss in power at the time of the
6 '593 patent?

7 MR. TO: Objection, form.

8 A. As a general statement in the field,
9 did there exist power supplies that had resistors
10 that measured current? Yes, at the time of the
11 '593.

12 Q. And if the resistance is fair- -- I'll
13 start again.

14 The -- the lower the resistance of that
15 resistor, the -- the lower the loss in power from
16 the resistor; is that right?

17 MR. TO: Objection, form.

18 A. In general, there's a trend. The
19 smaller the resistance for a given current, the
20 lower power dissipation or loss.

21 Q. And so the -- the design tradeoff if
22 you're using that type of resistance in -- to
23 measure current in a circuit is that you have to
24 have enough resistance to be able to measure
25 the -- the current but not so much that your --

1 your loss in power is significant; is that right?

2 MR. TO: Objection, form.

3 A. In general, in the field if you're
4 using a resistor for current measurements,
5 there's a tradeoff between power loss and noise
6 immunity and so you trade off. The smaller the
7 resistor, would have less loss, more
8 susceptibility to noise; larger resistor, higher
9 loss but lower susceptibility. And so the
10 designer would make a tradeoff between those two.

11 Q. What do you mean by noise immunity?

12 MR. TO: Objection, form.

13 A. Well, if you -- if you look at what --
14 the issue of making a resistor smaller and
15 smaller and smaller, it's -- the voltage across
16 it's smaller and smaller for a given current and
17 eventually, the circuit has more noise than your
18 measured signal and you couldn't resolve it.

19 Q. I actually want to go back to Figure 3
20 of the -- the -- the '593 patent. What does
21 Figure 3 show?

22 A. Figure 3 illustrates exemplary plots
23 302 and 304 of power supply output voltage and
24 power supply output current, respective [sic],
25 versus output power of an example M-I-S-O

1 amplifier or MISO amplifier.

2 Q. What is a MISO amplifier?

3 A. A MISO amplifier is a multiple input,
4 single output amplifier configuration.

5 Q. Were you familiar with the term MISO
6 amplifier before being retained by ParkerVision?

7 A. I certainly am aware of multiple input,
8 single output amplifiers. I don't recall if I
9 had heard that acronym used in that way.

10 Q. When you said you'd be aware of
11 multiple input, single output amplifiers, how
12 would you be aware of -- of those types of
13 amplifiers?

14 MR. TO: Objection, form, scope.

15 A. Ever since my Ph.D., I've been working
16 in RF electronics. We do power amplifiers so we
17 learned, we taught about all the different power
18 supply architectures -- or sorry, power
19 amplifiers -- RF power amplifier architectures.
20 So I came across them in reviewing the literature
21 and in courses I've taken and taught.

22 Q. What would be an example of a -- an
23 amplifier with multiple inputs and a single
24 output that you've encountered outside the
25 context of working for ParkerVision?

1 MR. TO: Objection, form, scope.

2 A. A digital Doherty, D-o-h-e-r-t-y. So
3 the Doherty has a peaking amplifier and a main
4 amplifier and the signals that go into each are
5 different so there are multiple inputs and then
6 the outputs are combined to make a final output
7 signal which is a single output.

8 Q. All right. Let -- let's look back at
9 Figure 3. What is the -- the x-axis that's shown
10 in both top and the bottom of Figure 3?

11 MR. TO: Objection, form.

12 A. Figure 3 is showing two plots of 302
13 and 304 and the x-axis of both of these plots are
14 power out, which one would understand as -- as
15 RF, radiofrequency, power out, and it's showing
16 zero to 30 dBm. If you just -- in a moment, I'll
17 just finish your answer. And it is noted in the
18 specification that power amplifiers might go down
19 to minus 40 dBm, but this plot is just done from
20 zero to 30 because the negative dBms aren't
21 needed. And negative dBm just means less than
22 one milliwatt.

23 Q. The -- the -- the power out in Figure 3
24 would be measured at the output of an amplifier;
25 is that right?

1 MR. TO: Objection, form.

2 A. That is how a POSITA would understand
3 that based on the description in the
4 specification and the figure.

5 Q. And the -- the Vcc on the top and the
6 Icc on the bottom of Figure 3 would be
7 measurements taken at the power supply of the
8 amplifier; is that right?

9 MR. TO: Objection, form.

10 A. Just for clarity, the top plot is Vcc
11 on the y-axis, pow out -- power out on the X and
12 the second one below it is Icc on the y-axis and
13 power out on the x-axis. And, yes, the
14 understanding is these descriptions would be with
15 respect to the supply to the outputs and Column
16 5, Line 37 describes, MISO amplifier, the power
17 supply output voltage, as an example.

18 Q. What is Vcc?

19 A. Vcc is generally just a -- a generic
20 label for supply voltage for a circuit.

21 Q. Is that a common abbreviation used in
22 the art, Vcc?

23 A. It -- it is. I think historically,
24 people used Vcc. Some people use Vdd depending
25 on the type of circuit and Vss, but generally,

1 Vcc is understood as being the supply voltage.

2 Q. What is the abbreviation cc in this
3 context?

4 A. I would have to -- to look that up.
5 I'm sure it refers to -- my best of recollection
6 is it refers to something perhaps historically in
7 bipolar circuits because I've seen Vcc for
8 decades now, but we just interpret it as the
9 supply voltage.

10 Q. So Vcc is a common label for a supply
11 voltage. Would -- would Icc also be a common
12 label for a supply current?

13 A. It would in the context of displaying
14 it with Vcc. If you had Icc by itself, I don't
15 think that's a -- necessarily a standard term
16 used, but in the context here, one would
17 understand it -- POSITA would understand it as
18 being related to Vcc so the supply current.

19 Q. Is the amplifier that's depicted in
20 Figure 3 part of the power supply for that
21 circuit?

22 MR. TO: Objection, form.

23 A. So Figure 3 is the output -- this is in
24 Column 5, 27. Plots of the power supply output
25 voltage and current, respectively, versus output

1 power of an example MISO amplifier. So this
2 would be the voltage and current of the power
3 supply feeding the MISO amplifier or supplying
4 the MISO amplifier.

5 Q. Would you consider the MISO amplifier
6 itself to be part of the power supply?

7 MR. TO: Objection, form, asked and
8 answered.

9 A. In the general context speaking of the
10 DC-to-DC power supply, no, the power amplifier
11 would be the load or the thing that's attached to
12 the output of the power supply.

13 Q. What is the operating voltage range of
14 the amplifier that's shown in Figure 3?

15 A. The -- As illustrated in the exemplary
16 plot 302, the collector/drain voltage of the MISO
17 amplifier is 1.39 volts to 3.6 volts. And that's
18 consistent with the diagram in Figure 3. It's
19 just hard to read the figure as -- but the text
20 describes what the levels are.

21 Q. What happens when that voltage range is
22 exceeded?

23 MR. TO: Objection, form.

24 A. The patent doesn't describe what
25 happens after that, when that's exceeded. It

1 only describes that voltage range.

2 Q. Based on your experience in the art,
3 what would be typical consequences of exceeding
4 the voltage range of a -- of an amplifier?

5 MR. TO: Objection, form, scope.

6 A. In general, if you have a circuit
7 that's supposed to operate, let's say, to 3.6
8 volts and you apply 20 volts, oftentimes, it'll
9 break the circuit.

10 Q. How is the maximum voltage of an
11 amplifier typically determined?

12 MR. TO: Objection, form, scope.

13 A. For clarity, you mean the maximum
14 voltage so it doesn't break?

15 Q. Correct.

16 A. That is determined by knowing the
17 voltage breakdown of the devices and then
18 analyzing the voltages in the circuit to
19 determine which device breaks down first. Based
20 upon the device breakdown voltages, you would
21 understand at what voltage it breaks down.

22 Q. Would an amplifier itself limit the
23 amount of voltage?

24 MR. TO: Objection, form.

25 A. In general, analog amplifiers, the

1 output is traditionally limited to the supply so
2 the Vcc and we could call it Vdd or ground so
3 that just -- as a physics matter you can't go
4 higher than the supply in a general linear
5 amplifier -- analog linear. In RF, the output of
6 the amplifier can exceed Vcc, and it's often done
7 that way to get more efficiency so it can go
8 above Vcc.

9 Q. How would an amplifier go above Vcc?

10 A. The power amplifiers use inductors and
11 so you would store current in the inductor and
12 when the switch to the power amplifier turns off,
13 that inductor would raise the voltage above Vcc.
14 Many amplifiers will operate up to twice Vcc.
15 And I should just clarify, radiofrequency
16 amplifiers.

17 Q. All right. You see there's a flat line
18 on the right side of Figure 3?

19 A. I do.

20 Q. And -- and -- and just to be a -- a
21 little bit more clear here, Figure 3 depicts a
22 curve 302 which flattens out toward the right
23 side of -- of the figure.

24 Do you see that?

25 A. I do see the --

1 MR. TO: Objection, form.

2 A. I do see the flat portion on the right.

3 Q. What does the flat portion on the right
4 of the curve 302 indicate?

5 A. It in- - indicates - - I think a POSITA
6 would read that as the supply voltage is
7 constant.

8 Q. Why is the supply voltage constant in
9 Figure 3 of the '593 patent?

10 MR. TO: Objection, form.

11 A. Well, I mean, Figure 3 are exemplary
12 plots of a power supply output voltage and
13 current and, as illustrated, the plot 302, the
14 collector during voltage of the MISO amplifier is
15 1.39 to 3.6 volts so it stops at 3.6 volts.
16 That's the range it stops at and so that's why
17 when the curve in 3 goes up and hits 3.6, it
18 stays flat.

19 Q. Why does the voltage in the curve at
20 the top of Figure 3 of the '593 patent stop at
21 3.6 volts?

22 (Reporter asks to repeat.)

23 MR. DAY: Sure.

24 BY MR. DAY:

25 Q. Why does the voltage in the curve 302

1 on the top of Figure 3 of the '593 patent stop at
2 3.6 volts?

3 MR. TO: Objection, form, asked and
4 answered.

5 A. This is an example MISO amplifier and
6 so in this example, they're plotting the power
7 out and supply in that range so that's what they
8 decided to plot in Figure 3.

9 Q. What circuit element is causing the --
10 the voltage to be limited to 3.6 volts in the
11 upper plot of Figure 3 of the '593 patent?

12 MR. TO: Objection, form.

13 A. Well, Figure 3 is with respect to an
14 example MISO amplifier. So my understanding from
15 the specification, that the amplifier output is
16 from 1.39 volts to 3.6 volts so the supply of the
17 MISO amplifier is affixed so that its value is
18 3.6 volts, and that's what is shown in Figure 3.

19 Q. How is the supply of the MISO amplifier
20 fixed so that its value is 3.6 volts above a
21 certain power level?

22 A. This --

23 MR. TO: Objection, form.

24 A. So this is a characterization of a MISO
25 amplifier. So this is -- you are looking at

1 parameters to characterize. So they have a
2 supply voltage and they have supply current
3 versus Pout and they're characterizing it for
4 when it goes up to 3.6, it stays at 3.6. So this
5 is the characterization of the MISO amplifier.

6 Q. So Figure 3 basically is not
7 characterizing the behavior of the MISO amplifier
8 with an input voltage of more than 3.6 volts; is
9 that right?

10 MR. TO: Objection, form,
11 mischaracterizes.

12 A. The Figure 3 characterizes it for 1.39
13 to 3.6 volts and it doesn't characterize it above
14 3.6 volts. It keeps 3.6 volts constant once it
15 reaches 3.6 volts.

16 Q. And it reaches 3.6 volts somewhere
17 around 28 dBm on the x-axis. Is that about
18 right?

19 A. Yeah, approximately 27, 28 dBm.

20 Q. So above 2- -- above 28 dBm, Figure 3
21 is showing increasing current at the same
22 voltage; is that right?

23 MR. TO: Objection, form.

24 A. A POSITA reading this would understand
25 that Vcc is kept at 3.6 volts and the Icc

1 continues to rise from roughly 27, 28 to 30 in
2 304.

3 Q. Does Figure 3 show the operation of the
4 bypass function described in claim 1 of the '593
5 patent?

6 A. Figure 3 --

7 MR. TO: Hold on. Objection, form.

8 A. Figure 3 plots 302 and 304 of the power
9 supply output voltage and supply output current,
10 respectively, versus the output power of an
11 example MISO amplifier. So it plots the voltage
12 and current of that example MISO. That's what it
13 shows in Figure 3.

14 THE VIDEOGRAPHER: We've got about five
15 minutes left.

16 BY MR. DAY:

17 Q. Okay. You mentioned earlier that the
18 power supply was limited to 3.6 volts. Would a
19 bypass function be a way of limiting the power
20 supply to 3.6 volts?

21 MR. TO: Objection, form,
22 mischaracterizes.

23 A. I believe what I stated was the supply
24 was held at 3.6. Could have been capable of
25 doing more, but it's held at -- at 3.6. I think

1 that answers the first part of the question.

2 The second part of the question, I
3 think there's -- you'd have to make several
4 assumptions. Certainly, Figure 3 is not
5 inconsistent with using a bypass switch. For
6 instance, if your battery was 3.6 volts, you
7 could close a bypass switch and maintain it at
8 3.6 volts as an example.

9 Q. I think I asked you a little bit
10 earlier about the -- the limits of the -- the
11 voltage limit of the amplifier. So it --
12 would -- would it be fair to say that if the --
13 if the operating range of an amplifier was
14 limited to 3.6 volts that exceeding that voltage
15 could create a safety risk or a risk of damaging
16 the amplifier?

17 MR. TO: Objection, form.

18 A. Not in the context of many RF
19 amplifiers. As I mentioned before, it's very
20 common to design them so that their output goes
21 higher than the supply voltage, usually not more
22 than twice the supply voltage.

23 Q. And maybe I should -- I should clarify
24 my question. Would it be fair to say if the
25 supply voltage of an amplifier was limited to 3.6

1 volts that exceeding that supply voltage can
2 create a safety risk or a risk of damaging an
3 amplifier?

4 MR. TO: Objection, form, asked and
5 answered.

6 A. Your question's specific to the supply
7 voltage. In this case, it's -- well, with
8 respect to a supply voltage, exceeding a supply
9 voltage that is safe for the device would
10 cause -- could cause harm to that device. I
11 think that's a general statement of any
12 electronic amplifier.

13 Q. So one purpose of limiting the supply
14 voltage to the maximum supply voltage for the
15 amplifier would be preventing harm to the device;
16 is that correct?

17 A. Could be one of --

18 MR. TO: Objection, form.

19 A. Could be one of many reasons.

20 MR. DAY: Okay. Are we about at the
21 end there?

22 THE VIDEOGRAPHER: Yeah.

23 MR. DAY: Okay. All right. Okay.

24 THE VIDEOGRAPHER: This is the end
25 of --

1 THE WITNESS: Okay. Good.

2 THE VIDEOGRAPHER: This is the end of
3 Disc Number 1. The time is 12:02.

4 (Whereupon, there was a recess in the
5 proceedings from 12:02 p.m. to 12:14 p.m.)

6 THE VIDEOGRAPHER: This begins Disc
7 Number 2 in the deposition of Dr. David Ricketts.
8 The time is 12:14.

9 BY MR. DAY:

10 Q. All right. Welcome back, Dr. Ricketts.

11 A. Thank you.

12 Q. So I think before we left during the
13 break, we were talking about Figure 3 and the
14 power amplifier that had a -- a range of
15 operating limits.

16 Do you -- do you recall that?

17 A. I do recall discussing Figure 3.

18 Q. Now, can I -- I'm going to direct your
19 attention to Column 6 of the '593 patent at Lines
20 28 through 33. And I believe that section reads,
21 For example, referring to exemplary plot 302, an
22 optional power supply bypass switch can be used
23 to bypass the power supply when the power supply
24 output voltage required by the MISO amplifier
25 reaches 3.6 volts, which corresponds to an output

1 power of 26 dBm or 400 milliWatts.

2 Do you see that?

3 A. I do see that.

4 Q. Would that description in Column 6,
5 Lines 28 to 33 of the '593 patent explain the
6 flat portion on the right side of the plot 302 in
7 Figure 3 of the '593 patent?

8 MR. TO: Objection, form.

9 A. I -- I think a POSITA would understand
10 that Figure 3 is characterizing the MISO
11 amplifier in general and it does increase the
12 supply up to 3.6 and holds it. And then Column
13 6, 28 through 35 that you just read is referring
14 to if you're at 3.6, you could close the bypass
15 switch -- use the bypass switch the power supply
16 when the power supply output reaches 3.6 volts,
17 which corresponds to an output power of 26 dBm or
18 400 milliwatts. So that's describing what you
19 could do at that point.

20 Q. Would the bypass function described in
21 Column 6, Lines 28 to 33 result in the Vcc being
22 limited to 3.6 volts as shown on the right side
23 of that trace 302 in Figure 3?

24 MR. TO: Objection, form, asked and
25 answered.

1 A. If we assume that there is a bypass
2 switch and when the supply reaches 3.6, the
3 bypass switch closes connecting the MISO to 3.6,
4 then I think that would be consistent with what's
5 shown in Figure 3.

6 Q. Does Column 6, Lines 28 to 33 describe
7 an embodiment that would practice the efficiency
8 threshold of claim 1 of the '593 patent?

9 MR. TO: Objection, form, calls for a
10 legal conclusion.

11 A. Column 6, 28 through 33 is describing
12 the bypass switch and it's describing an
13 embodiment where you can close the switch when it
14 reaches 3.6 volts. So this is closing the switch
15 when it reaches 3.6 volts.

16 Q. Would closing a switch when it
17 reach- -- reaches 3.6 volts practice the
18 efficiency threshold element of claim 1 of the
19 '593 patent?

20 MR. TO: Objection, form, calls for a
21 legal conclusion.

22 A. Well, I think we discussed before that
23 the claim 1 would look at power efficiency of the
24 power supply in determining a predetermined
25 threshold. That predetermined threshold could be

1 3.6 volts as an example. So the predetermined
2 threshold is expressed as a voltage on the signal
3 414, and that could be a value of 3.6, for
4 example.

5 Q. Does the purpose for which the
6 threshold is set matter for determining whether
7 the efficiency threshold is set in claim 1 of the
8 '593 patent?

9 MR. TO: Objection, form.

10 A. I apologize. Could you state that
11 differently? I didn't quite follow.

12 Q. Yeah. I'll -- I'll try to rephrase
13 that.

14 For purposes of analyzing whether the
15 efficiency threshold element of claim 1 of the
16 '593 patent is met, does the purpose of setting
17 the threshold matter?

18 MR. TO: Objection, form.

19 A. I understood the question to be, does
20 setting a predetermined threshold matter with
21 respect to the efficiency limitation in claim 1?
22 And I would say yes, because it re- -- has a
23 predetermined threshold. But maybe I understood
24 what you asked wrong.

25 Q. Does it matter why the threshold is set

1 at a particular value?

2 A. I think it requires to be based upon
3 the power efficiency and a POSITA understand --
4 reading the specification would understand the
5 goal in this patent is to increase efficiency.
6 So I -- I would think that, yes, the efficiency
7 would need to be considered and the goal in
8 general of this patent in the field is to
9 increase efficiency. I'm not sure if that
10 answered your question.

11 Q. So if -- if the purpose of setting a --
12 a voltage threshold to perform the bypass
13 function is just to avoid exceeding the maximum
14 supply voltage of the power amplifier, would that
15 by itself satisfy the efficiency threshold
16 element of claim 1 of the '593 patent?

17 MR. TO: Objection, form, incomplete
18 hypothetical, calls for a legal conclusion.

19 A. If you determined a predetermined
20 threshold that was based upon voltage
21 restrictions like breakage or operation of the
22 power amplifier, that would be not related based
23 upon power efficiency.

24 Q. Okay.

25 MR. DAY: Okay. And I -- I do want to

1 make one, like, really brief note to counsel.
2 Like, I -- I -- I do note now that this probably
3 isn't going to matter for anything, but I do note
4 that in the -- the Office Trial Practice Guide
5 there's some guidance about objections. So
6 usually, for all the, like, various forms of,
7 like -- form objection's really just reduced to
8 form.

9 MR. TO: Yeah. Noted. Thank you.

10 BY MR. DAY:

11 Q. Can you turn to Column 5 of the '593
12 patent starting at Line 40. Actually, excuse me.
13 If you'd start at Line 45. It says, to achieve
14 the highest system efficiency possible using
15 CDMA -- CDMA PDF 200, the switching power supply
16 should be designed to operate at its highest
17 efficiency when its output voltage is
18 approximately 1.39 volts and, correspondingly
19 from exemplary plot 304, when its output current
20 is approximately 100 milliAmps.

21 Do you see that?

22 A. I do see that.

23 Q. Now, and -- and that's a reference to
24 an earlier description in that same column that
25 says that the most probable output power occurs

1 at 17 dBm.

2 A. Figure 5, Line 19, Further, since the
3 probability of transmission -- I -- above that.
4 Sorry. Fif- -- 17. Line 17, Column 5, Indeed,
5 mathematical analysis shows that the mean or
6 expected value of the PDF, probability
7 distribution function, 200 is approximately 17
8 dBm or 50 milliWatts.

9 Q. And if you turn back to Figure 3 of the
10 '593 patent, would you agree that the -- the Vcc
11 MISO is still operating at approximately its
12 minimum input voltage at 17 dBm?

13 MR. TO: Objection, form.

14 A. The -- Column 5, Line 43 states, for an
15 output power of 17 dBm, the collector/drain
16 voltage of the MISO is approximately 1.39 volts,
17 that's correct.

18 Q. And the changeover where the -- the
19 curve flattens out and is capped at 3.6 volts
20 occurs at around 28 dBm, right?

21 MR. TO: Objection, form.

22 A. Column 6, Line 32 states, 3.6 volts,
23 which corresponds to an output power of 26 dBm,
24 so about 28 dBm. It just -- it -- I just wanted
25 to clarify that one.

1 Q. And I think we had some discussion
2 earlier about how that -- that flattening on the
3 right side of -- of that curve 302 could be the
4 result of a bypass function that's described in
5 Column 6; is that right?

6 MR. TO: Objection, form.

7 A. A bypass function could be used and is
8 consistent with Figure 3. In using that -- my
9 understanding is Figure 3 is characterizing the
10 power amplifier, whereas Column 6, Line 30 is
11 talking about what -- what can somebody do with
12 that power amplifier, such as including a bypass
13 switch.

14 Q. All right. So it -- in Figure 3 of the
15 '593 patent, if the -- the bypass switch -- I'll
16 start again.

17 If the input voltage to the power
18 amplifier shown in Figure 3 of the '593 patent is
19 being limited by the bypass switch, the threshold
20 power where that bypass switch triggered -- is
21 triggered is not the most probable input power;
22 is that right?

23 MR. TO: Objection, form.

24 A. The beginning of the flat portion in
25 Figure 3 in the Vcc MISO 302 we discussed earlier

1 is approximately 27 to 28 dB visually. As I
2 mentioned before, the -- Column 6, Line 32
3 states, 26 dBm. It's about the same range. So
4 26, 27, 28 dBm is not 17 dBm.

5 Q. So in that example in Column 6, the
6 threshold for activating the bypass function is
7 not based on the most probable input power of 17
8 dBm, correct?

9 MR. TO: Objection, form.

10 A. Column 6, Lines 28 through 33 states,
11 an optional power supply bypass switch can be
12 used to bypass the power supply when the power
13 supply output voltage reach- -- reached by the
14 MISO amplifier reaches 3.6 volts, which
15 corresponds to an output power of 26 dBm. And 26
16 dBm is not 17 dBm.

17 Q. And, actually, since we -- I talked a
18 little bit about most probable output power. Can
19 you go back to Figure 2 of the -- the '593 patent
20 for a moment. What is Figure 2 of the '593
21 patent?

22 A. An exemplary network characteristic of
23 code division multiple access (CDMA) network is
24 shown in Figure 2, which illustrates the
25 probability density function (PDF) 200 of a

1 handset output power used on a reverse link
2 (handset to base station) and measured at the
3 power amplifier output of the handset.

4 Q. Does the chart in -- in Figure 2 depict
5 a specific device?

6 MR. TO: Objection, form.

7 A. In that it's referring to the handset
8 as opposed to a base station, it does. It does
9 not specify the type of handset.

10 Q. Would the probability distribution
11 function shown in Figure 2 change based on the
12 handset?

13 A. Assuming --

14 MR. TO: Objection, form.

15 THE WITNESS: Sorry.

16 A. Assuming it's used in the same network
17 under the same requirements operating in CDMA,
18 the probability distribution function is a
19 function of the CDMA rather than the specific
20 handset. I ju- -- just should note it could
21 change in relative powers, more higher powers,
22 but CDMA is determining the -- the PDF.

23 Q. And the -- the power for -- in Figure 2
24 is given -- on the x-axis is given in watts,
25 correct?

1 A. That is correct.

2 Q. And based on the correspondence that we
3 discussed earlier between watts and -- and dBm,
4 the -- one times ten to the minus three watts
5 would be zero dBm, correct?

6 A. That is --

7 MR. TO: Objection, form.

8 A. That is correct.

9 Q. The -- and the peak of the probability
10 distribution shown in Figure 2 actually occurs to
11 the left of that -- that one milli- -- milliwatt
12 point; is that right?

13 MR. TO: Objection, form.

14 A. In looking at the plot, the center is
15 to the left of one times ten to the minus three
16 watts.

17 Q. Would it be fair to say then that if
18 you converted that plot to dBm that the -- the
19 peak would occur at a negative dBm value?

20 MR. TO: Objection, form.

21 A. So PDF 200 is showing the time
22 probability that a handset spends transmitting in
23 a given output power level according to the CDMA
24 waveform. So it's describing the -- how often
25 it's in each one of these levels. The peak, as

1 you asked previously, is to the left of one times
2 ten to the minus three. Expressed in dBm, that
3 would be a negative number.

4 Q. So if you can turn to Column 5 of the
5 '593 patent. At Lines 17 through 19 it states,
6 mathematical analysis shows that the mean or
7 expected value of PDF 200 is approximately plus
8 17 dBm or 50 milliWatts.

9 Do you see that?

10 A. I do see that.

11 Q. Would -- would you agree that as shown
12 in -- in Figure 2, that peak of 17 dBm or 50
13 milliwatts would actually be well to the right of
14 the peak power output shown in -- in that
15 probabil- -- probability distribution function?

16 MR. TO: Objection, form.

17 A. Well, stated in Column 5, Line 17, the
18 inventors disclose, doing a mathematical analysis
19 and getting a value of 17 dBm and so that's the
20 result of their calculation. Is 17 dBm to the
21 right of the one times ten to the minus three?
22 It would be in this plot. I'm assuming this
23 distribution just doesn't have a correct x-axis
24 because the inventors calculated the actual
25 number.

1 Q. And when you say, the distribution
2 doesn't have the correct ax- -- x-axis, is there
3 a -- a difference between the -- what's described
4 in the text specification and the x-axis on the
5 plot in Figure 2?

6 MR. TO: Objection, form.

7 A. The text doesn't describe the x-axis.
8 The text describes the PDF as a time probability
9 and so Figure 2 shows a Gaussian curve for -- a
10 Gaussian-like curve for CDMA output power. The
11 specification says they calculated the expected
12 value at approximately 17 dBm and so that's their
13 calculation. The center of the distribution is
14 at something to the left of ten to the minus
15 three.

16 Q. All right. So it is your assumption
17 that -- that the x-axis in Figure 2 is just an --
18 a scrivener's error?

19 MR. TO: Objection, form,
20 mischaracterizes.

21 A. I believe Figure 2 is intended to show
22 the distribution is not at a single point, it's
23 not a uniform distribution. And they clearly
24 have calculated it to be 17 dBm so there may be a
25 conversion factor that was necessary to go from

1 Figure 2 to that calculation, but 17 dBm is what
2 they get from their calculation.

3 Q. Can you turn to Figure 6 of the '593
4 patent. Does Figure 6 show a power supply that
5 would practice the bypass element of claim 1 of
6 the '593 patent?

7 MR. TO: Objection, form.

8 A. So Figure 6 is an example graph 600
9 that illustrates efficiency enhancement due to
10 the use of the switch architecture in the power
11 supply. That's what's shown in Figure 6.

12 Q. Does -- I'll start again.

13 Would that example graph 600 depict
14 a -- a circuit that practices the efficiency
15 threshold element of claim 1 of the '593 patent?

16 MR. TO: Objection, form.

17 A. Figure 600 shows 604, which is the
18 efficiency curve with the bypass architecture,
19 and we can see that at 400 milliamps or .4 amps,
20 when the switch -- at that point, the switch is
21 turned on and the system becomes more efficiency
22 [sic]. So this is looking at the power
23 efficiency of the power supply and there's a --
24 a -- a threshold that correlates to .4 amps on
25 this circuit. So that would be a -- I think one

1 would understand that as a predetermined
2 threshold.

3 Q. How is the circuit shown in Figure 6
4 actually making the determination to activate a
5 bypass?

6 MR. TO: Objection, form.

7 A. So once again, we -- we have here
8 complete information about the power efficiency
9 of the DC-to-DC converter. And so a
10 predetermined threshold can be determined from
11 the efficiency and in this case, it correlates
12 to .4 amps. We can see the bypass switch turns
13 on and the efficiency jumps up as labeled on the
14 604 waveform.

15 Q. What value is being measured by the
16 circuit to determine whether to activate the
17 bypass function?

18 MR. TO: Objection, form.

19 A. Figure 6.

20 Q. I -- I apologize. You're -- you're
21 correct. Figure 6.

22 A. Figure 6 doesn't disclose the specific
23 threshold. However, it -- the current at .4 amps
24 for the MISO amplifier is at a Vcc of 3.6 volts
25 and the embodiments in the '593 can do a

1 comparison based upon a voltage to determine the
2 bypass switch closure.

3 Q. So is it your testimony that from
4 Figure 6, you cannot actually determine what --
5 what electrical value is being directly measured
6 to determine whether to activate the bypass
7 function?

8 MR. TO: Objection, form,
9 mischaracterizes.

10 A. So you can determine efficiency. You
11 can determine the current that it changes at.
12 Figure 3 shows us the voltage that that current
13 happens at. The, you know, description in the
14 patent is talking about the MISO having -- at .4
15 amps reaching 3.6 volts. So you have all of that
16 information from Figure 6 and the description in
17 the patent -- in the specification. Sorry.

18 Q. So if you had a bypass threshold based
19 on current set at 0.4 amps, that could result in
20 the plot 604 shown in Figure 4 of the '593
21 patent; is that right?

22 MR. TO: Objection, form.

23 A. If one refers to the power amplifier in
24 Figure 3, it shows 3.6 and -- and .4 amps are
25 correlated together. So in the specific data,

1 POSITA would understand that there's a -- a -- a
2 point correlation between 3.6 when it's reached
3 and .4 amps.

4 Q. So is it your testimony then that if
5 a -- that this -- the chart shown in Figure 6
6 could also be consistent with a bypass threshold
7 set at 3.6 volts if that voltage happened to
8 correspond to .4 amps for a particular power
9 supply?

10 MR. TO: Objection, form,
11 mischaracterizes.

12 A. I'm sorry. Could you restate your --
13 your question so I understand it better.

14 Q. If you had -- I'll start again.

15 Fig- -- the Plot 604 in Figure 6 of the
16 '593 patent could be consistent with a bypass
17 threshold set to 3.6 volts if the 3.6 volts was
18 correlated with 0.4 amps for that particular
19 power supply?

20 MR. TO: Objection, form.

21 A. The description of Figure 6 describes
22 the same power levels, 400 milliwatts, 26 dBm,
23 that was -- we discussed earlier with respect to
24 Figure 3 so I think a POSITA would understand
25 that that's the amplifier being used here. And

1 we see that Figure 6 is -- is -- with respect to
2 power efficiency. And the change is made at .4
3 amps and from Figure 3, .4 amps is -- correlates
4 to 3.6 volts. So as it shows in Figure 6, the
5 bypass switch is switched at 400 milliamps and
6 that's consistent with the characterization of
7 Figure 3 of the power amplifier.

8 Q. Does Figure 6 depict the performance of
9 the same power amplifier that's shown in Figure
10 3?

11 MR. TO: Objection, form.

12 A. Is your question is it the same power
13 amplifier or is it the same overall system? I'm
14 sorry. Just for clarification.

15 Q. I guess I can ask you both questions.
16 Does Figure 6 depict the same power amplifier as
17 Figure 3?

18 MR. TO: Objection, form.

19 A. The specification describes 17 dBm,
20 1.39 output voltage at 100 millivolt output. It
21 also describes 400 milliwatts at -- which is 26
22 dBm which is at 400 milliamps. All of those data
23 points are consistent with the MISO amplifier
24 described in Figure 3. So I think a POSITA would
25 understand that this is using the -- the same

1 numbers as looked at in Figure 3.

2 Q. Okay. So you used the phrase
3 consistent with. So it could be the same power
4 amplifier but not necessarily; is that right?

5 MR. TO: Objection, form.

6 A. Column 9 describes, you know, the
7 exemplary MISO amplifier. And if we look back at
8 Figure 3, it's introducing an example MISO
9 amplifier. So I -- I believe this
10 specification's talking about a specific example
11 which Figure 3 characterizes.

12 Q. The peak efficiency shown in Figure 6
13 occurs at about 0.1 amps; is that correct?

14 MR. TO: Objection, form.

15 A. It states in Column 9, 22, the
16 switching power supply is optimized for a
17 point -- a plus 17 dBm output, at a hundred
18 milliamps output current. And that statement in
19 the specification is -- is consistent with the
20 plot. Looks like it's peaking right around .1
21 amps or a hundred milliamps.

22 Q. The efficiency shown in plot 604 of
23 Figure 6 actually decreases between the peak
24 efficiency at 0.1 amps until the bypass threshold
25 is reached at 0.4 amps, correct?

1 A. 604 peaks at .1 amps or a hundred
2 milliamps and it does drop a few percent before
3 it reaches .4 amps or 400 milliamps.

4 Q. You'd agree that the -- I'll -- I'll
5 start again.

6 At -- at the point where the bypass
7 threshold is triggered at 0.4 amps, the
8 efficiency of plot 604 is about 89 percent; is
9 that right?

10 MR. TO: Objection, form.

11 A. In looking at the diagram, that sounds
12 in the right region.

13 Q. And the plot 604 also has an efficiency
14 of about 89 percent on the left side of the
15 diagram at, you know, just over -- just past
16 the -- the -- the left side of the x-axis, right?

17 A. Near zero amps the efficiency curve
18 does come back down and looks like it passes
19 through 89 percent.

20 Q. And because the efficiency is actually
21 decreasing between .1 amps and .4 amps, would you
22 agree that the efficiency exceeding a threshold
23 is not what immediately causes the -- the bypass
24 function to be activated at .4 amps?

25 A. Well, I think the predetermined

1 threshold is what is controlling the bypass
2 switch and as we can see here, it is increasing
3 the power efficiency of this system by doing so
4 at that point.

5 Q. Is increasing the power efficiency of
6 the system sufficient to satisfy the efficiency
7 threshold element of the '593 patent?

8 MR. TO: Objection, form.

9 A. The power efficiency of the power
10 supply is exceeding a predetermined threshold so
11 I think a POSITA would understand you'd set a
12 threshold. You could go above -- above it or
13 below it. You just have to pass through whatever
14 your threshold is. And at .4 amps on the x-axis
15 is where it makes the switch to a more efficient
16 604.

17 Q. So I -- I -- I want to make sure I
18 understand what you said by, you can go above it
19 or below it. Does that mean then that the
20 threshold -- the predetermined threshold could be
21 triggered at a point where the efficiency is
22 actually decreasing and still satisfy claim 1 of
23 the '593 patent?

24 MR. TO: Objection, form.

25 A. I think certainly in engineering, we

1 set thresholds and to exceed them would be in the
2 context of the system. So there's oftentimes
3 where the threshold -- when we go below it, we've
4 exceeded the threshold. Other thresholds we go
5 above it. So I don't see that being
6 inconsistent.

7 Q. So if the -- the circuit that's
8 activating the bypass element is triggering
9 the -- the bypass function based on a voltage
10 being accelerated -- or -- I'll start again.

11 If the circuit that's activating the
12 bypass function is triggering that function based
13 on a voltage being exceeded and that voltage is
14 consistent with a predetermined efficiency, then,
15 in your opinion, would that function satisfy the
16 efficiency threshold element of claim 1 of the
17 '593 patent?

18 MR. TO: Objection, form.

19 A. So in Figure 6 when the -- so the --
20 when the amplifier reaches .4 amps DC current,
21 it's at 3.6 volts and 3.6 can represent or be
22 based upon the power efficiency analysis in
23 Figure 6. And so when it looks at 3.6, it knows
24 because it knows the entire power efficiency of
25 the system that the -- turning on the bypass

1 switch will increase the efficiency as stated in
2 the specification.

3 Q. In your last answer you said, when it
4 looks at 3.6 and -- it knows because it knows the
5 entire power efficiency of -- of the system, what
6 are you referring to there?

7 MR. TO: Objection, form,
8 mischaracterizes.

9 A. So the -- first off, we have an
10 understanding of the power efficiency of the
11 system versus voltage and current from Figure 3
12 and Figure 6. And so the '593 discloses that we
13 can use a predetermined threshold to compare two
14 voltages. And so we can understand the power
15 efficiency from Figure 6 and Figure 3 and
16 determine a predetermined threshold, which could
17 be a signal voltage, 3.6. And so the -- for
18 example, the embodiment in Figure 4 has a
19 comparison of the predetermined threshold and
20 a -- a voltage. In this case, the predetermined
21 threshold could be the voltage 3.6 which allows
22 it to achieve the greater efficiency when
23 switched.

24 Q. So the efficiency that's shown in the
25 y-axis of Figure 6 could be an efficiency that's

1 determined by an engineer during the design
2 process; is that right?

3 MR. TO: Objection, form.

4 A. This would be an efficiency that would
5 be determined by testing or simulation so when
6 you actually have the product, you would
7 understand how the efficiency operates.

8 Q. The circuit itself does not need to
9 determine the efficiency shown on the y-axis of
10 Figure 6; is that right?

11 A. All that's required by the claim is a
12 predetermined threshold, and that could be
13 determined by something other than the hardware
14 of the circuit that implements the bypass switch.

15 Q. Can you turn to Paragraph 78 of your
16 declaration. It's Page 36 through 37.

17 A. I am at Paragraph, I think -- 78 did
18 you say?

19 Q. Yes.

20 A. Okay.

21 Q. You state in your declaration that, As
22 the specification explains in connection with
23 Figure 6 (annotated and reproduced below), the
24 resulting power supply design "is optimized for a
25 17 dBm output (1.39 volt -- voltage -- output

1 voltage and 100 milliAmp output current)" based
2 on the power efficiency characteristics of Figure
3 1 and the network characteristics of Figure 2.

4 Did I read that correctly?

5 A. You did read that correctly.

6 Q. Where does the '593 patent actually say
7 that Figure 6 was based on the power efficiency
8 curves in Figure 1?

9 MR. TO: Objection, form.

10 A. Figure 1 is describing exemplary plots
11 for output current of a switching power supply
12 for two exemplary values of output power. So
13 this is looking at the DC-to-DC converter
14 efficiency. Figure 3 is showing the
15 characterization of the power amplifier, and
16 Figure 6 is showing the power amplifier put
17 together with the power supply.

18 Q. My question was more specific. You
19 asserted in your declaration that Figure 6 was
20 based on the power efficiency characteristics of
21 Figure 1. And I'm asking you where the support
22 in the specification for that assertion is.

23 MR. TO: Objection, form.

24 A. I would think a POSITA -- my
25 understanding is a POSITA would look at Figure 1

1 as characterizing a power supply -- a DC-to-DC
2 power supply at, for instance, a voltage of 3.6
3 volts with peak efficiencies in the hundred to
4 200 milliamp range, which is described in Figure
5 1, and the power supply of Figure 6 would
6 incorporate the MISO amplifier of Figure 3 and a
7 power supply of Figure 1, which is showing the
8 power efficiency.

9 Q. So the '593 patent does not actually
10 say that Figure 6 is based on the power
11 efficiency calculations in Figure 1, does it?

12 MR. TO: Objection, form.

13 A. Those words do not appear in the
14 patent. However, POSITA would be informed by the
15 values and descriptions of Figure 1, Figure 3 in
16 understanding Figure 6 because it -- it requires
17 both understanding of the power supply and
18 understanding of the amplifier.

19 Q. Does the efficiency curve in -- I'll
20 start again.

21 So Figure 6 shows plots that are
22 defined as efficiency over a range of current,
23 correct?

24 A. Efficiency versus current is plotted.

25 Q. And Figure 1 also shows efficiency

1 versus current; is that right?

2 A. Figure 1 shows two plots of
3 efficiency -- let me restart.

4 Figure 1 shows efficiency versus
5 current and output voltage for two different
6 input voltages. Sorry. Yes. Let me rephrase
7 that. Read it backwards.

8 It shows efficiency versus output
9 current for two output voltages for varying input
10 voltages.

11 Q. Does -- do ei- -- either of the
12 efficiency versus current plots in Figure 6
13 correspond to any of the efficiency versus
14 current plots in Figure 1?

15 MR. TO: Objection, form.

16 A. Can you just restate it? I think I
17 heard it correctly, but just ask again.

18 Q. Do either of the efficiency versus
19 current plots in Figure 6 correspond to any of
20 the efficiency versus current plots in Figure 1?

21 MR. TO: Same objection.

22 A. Well, Figure 1 shows efficiency versus
23 current at different input voltages and so you'd
24 have to correlate the different lines in Figure 1
25 with Figure 3 in creating the efficiency curve of

1 Figure 6. So there's not a one-to-one
2 correlation because you have to take into account
3 that the MISO changes its voltage.

4 Q. Okay. So you -- you can't directly
5 correlate Figure 6 to any of the curves in Figure
6 1; is that right?

7 A. The line in Figure 6 does not appear in
8 Figure 1. You'd have to consider the Figure 3 to
9 correlate.

10 Q. Would the plot in Figure 6 change
11 depending on what communication waveform was
12 being used by the device?

13 MR. TO: Objection, form.

14 A. Figure 6 is optimized for 17 dBm output
15 at 1.39 volts. And referring back to Column 5,
16 Line 18 describes the PDF of CDMA. It says,
17 Further, since the probability of transmission is
18 plus 17 dBm -- and so that was the -- calculated
19 from the mathematical analysis of CDMA. So the
20 17 dBm comes from the Figure 2, a probability
21 distribution function of CDMA, and then Figure
22 sips -- 6 describes optimizing the efficiency at
23 17 dBm so that would come directly from CDMA.

24 Q. How would a person of ordinary skill in
25 the art optimize the efficiency of a -- of a

1 power supply for a given power level?

2 MR. TO: Objection, form.

3 A. So there's a tradeoff in power supply
4 design between conduction currents and switching
5 currents, and the peak of that can be shifted by
6 your component choice. So you can move it to
7 peak at a different current depending upon your
8 component choice.

9 Q. And would a person of ordinary skill in
10 the art understand that tradeoff?

11 A. Yes. That's a common tradeoff that we
12 discuss in power -- what do you call it -- power
13 supply design.

14 Q. Does the '593 patent itself
15 specifically describe that tradeoff?

16 A. No. That's something a POSITA would
17 just know from basic power supplies.

18 Q. So, for example, if you want to go to
19 Figure 11 of the -- the '593 patent. There's
20 a -- in Figure 11 there's a block 1106 which
21 reads, Controlling an output stage power supply
22 within the power amplification system to operate
23 at substantially optimal efficiency at the
24 probable output power point of operation.

25 Do you see that?

1 A. I apologize. I'm at Figure 11. Could
2 you reference which number you're looking at.

3 Q. It -- it's the bottom block --

4 A. Okay.

5 Q. -- 1106.

6 A. Okay. I'm there.

7 Q. And I'll read it again. Block 1106
8 reads, Controlling an output stage power supply
9 within the power amplification system to operate
10 at substantially optimal efficiency at the
11 probable output power point of operation.

12 Do you see that?

13 A. I do see that.

14 Q. Would a POSITA know how to perform that
15 step described in Block 1106 of Figure 11 of the
16 '593 patent?

17 MR. TO: Objection, form.

18 A. Yes, I believe a POSITA would
19 understand that.

20 Q. And would -- would a POSITA's
21 understanding relate to that description you gave
22 a few answers ago about the tradeoff in power
23 supply between conduction currents and switching
24 currents?

25 MR. TO: Objection, form.

1 A. Certainly, a POSITA would understand
2 how to optimize the power efficiency of a
3 DC-to-DC for a specific operating point such as
4 the most probable point for a communication
5 waveform.

6 Q. Does the '593 patent itself provide any
7 more detailed explanation of how to perform Step
8 1106 in Figure 11?

9 MR. TO: Objection, form, scope.

10 A. Its description is -- I haven't checked
11 it word for word, but it describes it in Column
12 6, Line 16, 15. I think a POSITA would
13 understand, controlling an output stage power
14 supply within the power amplification system to
15 operate at substantially optimal efficiency at
16 the optimal output power points. I think a
17 POSITA would understand those words in the table
18 and in the specifications.

19 Q. When did we start?

20 MR. TO: 12:15.

21 A. 12:15.

22 Q. 12:15. Okay. I can go for another ten
23 or so.

24 All right. Let's look back at the
25 claims of the '593 patent. So in -- in claim 1

1 in the '593 patent, I think at the start of this
2 deposition we -- you know, we talked about using
3 the phrase bypass function to refer to the end of
4 the claim where the language says, the aperture
5 generator and control module deactivates the
6 switching device and passes the input voltage to
7 the output voltage node.

8 Do you recall that?

9 A. I do recall that.

10 Q. And, now, claim 2 further reads,
11 wherein the aperture generator and control module
12 is configured to deactivate the switching device
13 based on a load current at the output voltage
14 node.

15 Do you see that?

16 A. I do see that.

17 Q. Would you agree that deactivating the
18 switching device is the same bypass function
19 that's recited in claim 1?

20 MR. TO: Objection, form.

21 A. No, I would not agree that that was the
22 same.

23 Q. Why would you disagree?

24 A. So claim 1 -- so this is Column 11,
25 Line 24, the aperture -- aperture generator and

1 control modulator deactivates the switching
2 device and passes the input voltage to the output
3 voltage node. Claim 2 says, wherein the aperture
4 generator control module is configured to
5 deactivate the switching based on a load current
6 at the output voltage node. So there's no
7 description in claim 2 about the bypass switch.
8 It's just deactivating the switching device.

9 Q. In order for claim 2 of the '593 patent
10 to be practiced, would you need to have a second
11 threshold to deactivate the switching device?

12 MR. TO: Objection, form.

13 A. In reading this, 2 gets appended onto 1
14 and so you meet the limitations of 1, and then
15 this is just adding an additional constraint or
16 limitation of deactivating the switch based on a
17 load current. So one could envision, just as an
18 example, an overcurrent condition and turning off
19 the switcher. So I -- I don't see that it
20 requires -- it -- it would require measuring the
21 load current and turning off the switch or
22 deactivating the switching device based on that
23 load current.

24 Q. Would deactivating the switching device
25 and passing the input voltage to the output

1 voltage node based on a load current at the
2 output voltage node satisfy claim 1?

3 MR. TO: Objection, form.

4 THE REPORTER: I'm sorry. Could you
5 repeat that? I missed the end of it.

6 BY MR. DAY:

7 Q. Would claim 1 be satisfied if the
8 aperture generator and control module deactivates
9 the switching device and passes the input voltage
10 to the output voltage node based on a load
11 current at the output voltage node?

12 MR. TO: Objection, form.

13 A. So I think that the question is mixing
14 the two claims. So we need a -- an aperture
15 generator control module configured to control
16 the switching device in the limitation in claim
17 1, and then that same aperture generator and
18 control is configured to deactivate based upon a
19 load current. So those are two things that that
20 aperture generator control is configured to do.
21 Claim 1 doesn't require the configuration for the
22 load current, and claim 2 does require the
23 additional configuration.

24 Q. Would claim 1 preclude performing
25 that -- the bypass function of deactivating the

1 switching device and passing the input voltage to
2 the output voltage node based on a load current?

3 MR. TO: Objection, form.

4 A. Claim 1 describes a predetermined
5 threshold related to the power efficiency of the
6 power supply and, as we discussed before, that
7 threshold comes in the form of a signal, which
8 could be a voltage. There isn't an embodiment
9 that describes using a current for that, just a
10 voltage as an input to the aperture generator and
11 control for that predetermined threshold.

12 Q. And just to go back to one of your
13 earlier answers, you said you -- you could
14 have -- and I -- I'm just reading from the answer
15 here. You said, one could envision, just an
16 example, an overcurrent condition turning off the
17 switch.

18 Is there any description in the '593
19 patent of an overcurrent condition deactivating
20 the switching device?

21 A. Column 9, Line 1, Optional Load Current
22 Sensing Circuit 504 is coupled to the output node
23 of the power supply 500. In an embodiment, Load
24 Current Sensing Circuit 504 senses load current
25 to determine any variations that may affect the

1 power supply output voltage Tout 506. I think
2 that describes if you had a overcurrent limit --
3 overcurrent situation that would substantially
4 affect the output of Figure 5. And I believe it
5 should be Vout, not Tout, although the
6 specification says, Tout.

7 Q. Does that portion of the specification
8 you just read directly refer to an overcurrent?

9 A. I think a POSITA reading that --

10 MR. TO: Objection, form.

11 A. -- would understand that sensing
12 current and affecting the output voltage is the
13 function of an overcurrent, is to measure the
14 current and determine its variation on the
15 output.

16 Q. All right. Let's look at claim 6. And
17 claim 6 recites, wherein the aperture generator
18 and control mad -- module is configured to
19 deactivate the switching device and pass the
20 input voltage to the output voltage node based on
21 a comparison of the down-converted input voltage
22 to a threshold voltage.

23 Do you see that?

24 A. I do see that.

25 Q. Now, that fun- -- the function recited

1 in claim 6, deactivate the switching device and
2 pass the input voltage to the output voltage
3 node, is the same bypass function, deactivates
4 the switching device and passes the input voltage
5 to the output voltage node, that's described in
6 claim 1; is that right?

7 MR. TO: Objection, form.

8 A. I think structurewise it -- it does
9 not. It's a dependent claim so it's -- it's
10 further narrowing claim 1, adding additional
11 limitations. And here, the aperture generator
12 and control module is configured so it's
13 configured to do whatever it was in claim 1.
14 It's also configured to do -- to deactivate the
15 switching device and pass the input voltage to
16 the output based on a comparison of the
17 down-converted input voltage to a threshold
18 value. So it's specifying the input voltage.

19 MR. TO: Counsel, we've been going for
20 over an hour. Would this be a good time to take
21 a break?

22 MR. DAY: Yeah. I mean, we're get- --
23 like, getting pretty close to a logical stopping
24 point so I might just finish this line of
25 questioning --

1 MR. TO: Yeah.

2 MR. DAY: -- and then go.

3 MR. TO: That's -- that's fine.

4 MR. DAY: Yeah.

5 BY MR. DAY:

6 Q. In order for a -- a power supply to
7 practice claim 6 which depends from claim 1,
8 would it need to have separate thresholds to
9 satisfy the bypass element in claim 1 and the
10 additional element that is recited in claim 6?

11 MR. TO: Objection, form.

12 A. Claim 6 requires the aperture generator
13 and control model -- module to be configured to
14 deactivate the switching device based on a
15 comparison of the down-converted input voltage to
16 a threshold val- -- voltage. So there would need
17 to be a threshold voltage to compare that input
18 to.

19 Q. Could a single threshold of
20 down-converted input voltage satisfy both claim 1
21 and claim 6?

22 A. Well --

23 MR. TO: Objection, form.

24 A. Well, claim 1 and claim 6 are doing two
25 different -- two different comparisons. So if it

1 happened that the threshold voltage happened to
2 be the same number, they're still doing two
3 separate functions.

4 Q. Is it your testimony that claim 6 would
5 require two separate thresholds in order to
6 satisfy both the bypass function in claim 1 and
7 the additional element of claim 6?

8 MR. TO: Objection, form,
9 mischaracterizes.

10 A. Claim 6 requires a comparison of an
11 input voltage to a threshold voltage. That can
12 be separate from the one in claim 1, but it --
13 like I said, it could be the same -- the same
14 voltage. One would have to look at the system.

15 Q. Is there any description in the
16 specification of the '593 patent of a bypass
17 function that has two separate thresholds within
18 the same power supply?

19 MR. TO: Objection, form.

20 A. In Figure 5 it describes optional
21 hysteretic control, and that is a voltage that is
22 optional and modifies and -- and is added to a
23 threshold voltage. And then the optional current
24 sensing circuit provides feedback signal to the
25 bypass switch module. In an embodiment, the

1 feedback includes information about sensed load
2 current, which can be used by the Byswi- --
3 Bypass Switch Control module to control the
4 operating mode of the switching power supply.

5 I think a -- a POSITA would understand
6 from that that you're measuring a load current.
7 To be able to control the operation, you would
8 need to be able to compare it to a discrete value
9 at least or to -- I would say a discrete value.

10 Q. Does any of the description that you've
11 just recited say that the -- the bypass
12 control -- or, excuse me, the bypass switch --
13 I'll start again.

14 Does any of the description that you've
15 just recited say that the bypass switch control
16 has two separate thresholds used to perform the
17 bypass function?

18 MR. TO: Objection, form, asked and
19 answered.

20 A. The specification clearly describes a
21 threshold, for instance, 414. And as I also
22 mentioned, a POSITA would understand, for
23 example, in the current sensing circuit that a
24 comparison would be made and that would require
25 a -- a reference.

1 MR. DAY: All right. I think we can
2 stop there.

3 MR. TO: Okay.

4 THE VIDEOGRAPHER: Off the record at
5 1:23.

6 (Whereupon, there was a lunch recess in
7 the proceedings from 1:23 p.m. to 2:07 p.m.)

8 THE VIDEOGRAPHER: Back on the record
9 at 2:07.

10 BY MR. DAY:

11 Q. Dr. Ricketts, I'm going to change gears
12 a little bit and talk about some of the specific
13 prior art grounds that were raised in the
14 petition.

15 Can you turn to Page 54 of your
16 declaration and look at Paragraph 111. In the --
17 the third sentence of Paragraph 111 of your
18 declaration you state, referring to the Hau
19 reference, Pdet, however, only determines the
20 DC-DC buck regulator's output voltage.

21 Do you see that?

22 A. I do see that.

23 Q. Is it your opinion that a bypass
24 threshold based on the output voltage of a DC-DC
25 buck regulator is not a threshold of power

1 efficiency?

2 MR. TO: Objection, form.

3 A. I think, as stated in 111, Pdet is
4 related to the RF input voltage and the RF input
5 voltage is not a quantity in the DC-to-DC
6 efficiency calculation.

7 Q. I believe the portion I just read
8 states the Pdet determines the DC-DC buck
9 regulator's output voltage Vcc2.

10 A. It does determine the output voltage
11 Vcc. I was just referring to what Pdet is
12 derived from, the RF input power.

13 Q. I'll -- my question to you, you know,
14 given the -- the statement in your declaration
15 that I just read was, is the regulator output
16 voltage Vcc2 a quantity that can be used for a
17 comparison of power efficiency?

18 MR. TO: Objection, form.

19 A. Vcc2 is a voltage so to understand the
20 power output, you would also need the current
21 which -- and that would give you the output
22 power. As we talked earlier, the continuous time
23 of the voltage and the current would calculate
24 the power out and for efficiency, you'd need to
25 know power out and power in.

1 Q. Does claim 1 of the '593 patent -- or
2 I'll start again.

3 Does the efficiency threshold of claim
4 1 of the '593 patent require the threshold to
5 account for current?

6 MR. TO: Objection, form.

7 A. The claim 1 is related to the power
8 efficiency of the power supply. So to calculate
9 the power efficiency, you need to understand the
10 input and output power because the power
11 efficiency's the ratio of the two. So if you
12 only know the output voltage, you don't have --
13 if you just have the output voltage, you don't
14 have the output current and then you'd also need
15 the input voltage and current.

16 Q. Now, I think we had several questions
17 where I asked you to clarify something along
18 these lines. You said, you need to understand.
19 Are you referring to what's happening within the
20 circuit itself or something that happens in the
21 design process?

22 A. I apol- --

23 MR. TO: Objection, form,
24 mischaracterize.

25 A. I don't apologize. I apologize. I

1 don't recall saying, you, but, obviously, you've
2 got the real-time there. So a POSITA needs to
3 calculate the output power which requires knowing
4 voltage and current. Efficiency requires knowing
5 the output power and also the input power.

6 Q. Does the circuit that actually performs
7 the bypass function based on the efficiency
8 threshold need to have access to both voltage and
9 current?

10 MR. TO: Objection, form, asked and
11 answered.

12 A. I believe we discussed earlier about
13 the power efficiency of the power supply. One --
14 for a specific power supply and a specific power
15 amplifier, one can characterize that to
16 understand the power efficiency and determine the
17 predetermined threshold for that. The
18 predetermined threshold can be a signal that can
19 take on either a voltage or a current as an
20 input. So you've understood the power efficiency
21 and that's based on power out and power in.

22 Q. So later on in that same paragraph on
23 Page 55 just above a excerpt of Figure 1 of the
24 '593 patent you say, This is demonstrated in
25 Figure 1 of the '593 patent, which shows a

1 non-linear relationship between output current
2 and power efficiency.

3 Do you see that?

4 A. I do see that.

5 Q. Does claim 1 of the '593 patent require
6 the efficiency threshold to be based on a -- a
7 measurement that has a linear relationship with
8 power efficiency?

9 MR. TO: Objection, form.

10 A. Claim 1 requires a predetermined
11 threshold in response to power efficiency of the
12 power supply and so the power efficiency varies
13 with output voltage and output current. As shown
14 in Figure 1, often it is not a linear function.

15 Q. So even if the -- the quantity being
16 directly measured such as voltage or current
17 doesn't have a linear relationship with power
18 efficiency, it could still be an indicator of
19 power efficiency for purposes of claim 1 of the
20 '593 patent, correct?

21 A. So --

22 MR. TO: Objection, form.

23 A. -- the -- you know, this discussion
24 here on, I guess, Paragraph 111 is because
25 there's a nonlinear relationship between current

1 and efficiency, just knowing current -- just
2 knowing a voltage, for instance, doesn't
3 necessarily tell you what the efficiency is. You
4 have to -- have to look at both the output
5 voltage and the output current. You can't assume
6 it's a simple linear relationship like a
7 resistor. You have to look at how the actual
8 function is like Figure 1 does. It examines an
9 actual efficiency versus current and voltage.

10 Q. Does the claim exclude using any
11 quantity that -- that has a nonlinear
12 relationship with power efficiency as an
13 indicator of power efficiency?

14 MR. TO: Objection, form, scope.

15 A. The claim only requires to determ- --
16 to predetermine the threshold in response to
17 power efficiency of the power supply. That's all
18 it requires.

19 Q. That requirement doesn't require the
20 threshold to have a linear relationship to power
21 efficiency?

22 MR. TO: Same objections.

23 A. It requires there to be a predetermined
24 threshold. That threshold, once again, would be
25 derived from understanding the power efficiency

1 that's there. And as I mentioned before,
2 efficiency versus current and voltage is
3 nonlinear in power supplies.

4 Q. In the following page of your
5 declaration on Paragraph 112 you state, In my
6 opinion, Hau does not disclose deactivating the
7 switching device "in response to a power
8 efficiency of the power supply exceeding a
9 predetermined threshold" because Hau's threshold
10 for bypassing the DC to DC buck convertor is
11 determined based on the operating range of the
12 power supply.

13 Do you see that?

14 A. I do see that.

15 Q. Does claim 1 of the '593 patent depend
16 on the purpose for setting the bypass threshold
17 at a particular value?

18 MR. TO: Objection, form, asked and
19 answered.

20 A. Once again, it requires determining a
21 predetermined threshold in response to power
22 efficiency of a power supply so you have to
23 understand the power efficiency and that is used
24 to set the predetermined threshold. In Hau,
25 they're just looking at a -- a functional

1 limitation of the DC to DC. They're not looking
2 at efficiency or anything related to it.

3 Q. So is it your testimony that the
4 language of claim 1 of the '593 patent would
5 exclude a threshold used to set the bypa- --
6 bass -- bypass function based on a functional
7 limitation of the circuit rather than efficiency
8 calculation?

9 MR. TO: Objection, form.

10 A. Hau teaches to connect the bypass
11 switch when you hit a compliance voltage of the
12 DC to DC. It does not teach anything related to
13 power efficiency, and claim 1 clearly is related
14 to power efficiency and the predetermined
15 threshold.

16 MR. TO: Counsel, can we go off the
17 record for a minute?

18 MR. DAY: Sure.

19 THE VIDEOGRAPHER: Off the record at
20 2:19.

21 (Discussion off the record.)

22 THE VIDEOGRAPHER: Back on the record
23 at 2:19.

24 BY MR. DAY:

25 Q. So is it your testimony that operating

1 a bypass function based on a compliance voltage
2 of a DC-to-DC buck converter would not satisfy
3 the efficiency threshold element of claim 1 of
4 the '593 patent?

5 MR. TO: Objection, form,
6 mischaracterizes.

7 A. A POSITA in reading Hau would
8 understand that it's making the switch
9 determination based on compliance. Claim 1, a
10 POSITA would read this and understand that a
11 predetermined threshold needs to be determined
12 and it's in response to power efficiency of the
13 power supply so related to power efficiency.

14 Q. And in the last sentence of -- that's
15 in Paragraph 112 of your declaration you say, nor
16 does it ensure that the power supply is optimized
17 for power efficiency.

18 You see that?

19 A. I do see that.

20 Q. Does claim 1 of the '593 patent require
21 ensuring that the power supply is optimized for
22 power efficiency?

23 MR. TO: Objection, form.

24 A. Those words are not in the claim.

25 Q. So turn back to Paragraph 110 on Pages

1 53 and 54 -- 54. In the -- the very last
2 sentence of that paragraph you say, RF power
3 (upon which Pdet is based) cannot be an indicator
4 of power efficiency of the power supply because
5 they are separate circuits relating to distinct
6 quantities (AC and DC, respectively).

7 Do you see that?

8 A. I do see that.

9 Q. Is Pdet in Hau an AC or DC signal?

10 A. Pdet would be a -- I would call it a
11 quasi DC signal. It tracks the RF input, but it
12 wouldn't include the carrier.

13 Q. What do you mean by quasi DC signal?

14 A. From looking at the embodiment in Hau
15 disclosed in Figure 7, there would be some
16 variation on Pdet, but it wouldn't be the RF
17 carrier. There'd be just some variation with the
18 input power.

19 Q. All right. Do you have a copy of the
20 Hau reference, Exhibit 100- -- I believe it's
21 Exhibit 1007, available?

22 A. Yes, I do.

23 Q. If you can turn to Figure 6 of Hau.
24 Let me know when you're there.

25 A. I'm there.

1 Q. Does Figure 6 of Hau show a power
2 supply?

3 MR. TO: Objection, form.

4 A. Figure 6 contains DC-to-DC regulator.
5 It also clai- -- includes a energy source VBAT so
6 VBAT is able to provide power. The DC-DC buck
7 regulator is also able to provide power.

8 Q. Do those components comprise a power
9 supply?

10 MR. TO: Objection, form.

11 A. The DC-to-DC converter is designed to
12 power -- to be -- to power by the 3.4 volt
13 battery and provide an output by its voltage
14 (here Vcc2) that goes to both PA1 and PA2.
15 That's the function of the DC to DC.

16 Q. Is Vcc2 the output of the power supply?

17 MR. TO: Objection, form.

18 A. The output of the DC-to-DC regulator is
19 Vcc2.

20 Q. Is Vcc2 the power supply for the power
21 amplifier PA1?

22 MR. TO: Objection, form.

23 A. The patent describes, The DC-to-DC
24 converter is designed to power the -- power by
25 the 3.4 volt battery and provide an output bias

1 voltage (here Vcc2) that goes to both PAs.

2 Q. Would you agree that with all else
3 being equal, a higher voltage at Vcc2 will result
4 in a greater power input from PA1?

5 MR. TO: Objection, form.

6 A. Could you state that last part of the
7 question? I just want to make sure I understood
8 it.

9 Q. Would you agree that with all else
10 being equal, a greater voltage at Vcc2 will
11 result in a greater power output from PA 1?

12 MR. TO: Same objection.

13 A. I think your question was, if Vcc is
14 greater, does that result in a greater -- sorry.
15 If -- if Vcc, which is a DC quantity, is greater
16 in value, do -- does the output of the power
17 amplifier, the RF signal -- is that greater? And
18 if I understood that correctly, that's not
19 necessarily so. The output of the power
20 amplifier is dependent upon the RF input.

21 Q. My question was, if all else is held
22 equal, would a greater voltage at Vcc2 result in
23 a greater power output from PA1?

24 MR. TO: Objection, form, asked and
25 answered.

1 A. Not necessarily.

2 Q. Why or why not?

3 A. Well, it's --

4 MR. TO: Objection, form.

5 A. As long as PA1 has sufficient voltage
6 to operate, then the output's determined on RF
7 in, output being RF power output.

8 Q. If RF in is held constant, would a
9 greater voltage at Vcc2 result in greater output
10 from PA1?

11 MR. TO: Objection, form.

12 A. As I said before, not necessarily. As
13 long as PA1 is -- has enough head room, the
14 output is determined upon the input. And if the
15 input is not changing, the output would not
16 change unless the properties of the PA were
17 changing somehow.

18 Q. What do you mean by head room?

19 A. Head room is -- it's just like any
20 electronics. If you don't put the batteries
21 in -- if you only put one battery in instead of
22 two batteries, there's not enough voltage to
23 operate. So head room is just how much voltage
24 do you have? Circuits need a minimum voltage to
25 be able to operate. And so as long as PA1's

1 operating, it should -- the output should be
2 related to the input power.

3 Q. So is it your testimony that as long as
4 the -- PA1 has sufficient head room, the output
5 power for the same signal would not increase with
6 greater voltage at Vcc2?

7 MR. TO: Objection, form,
8 mischaracterizes.

9 A. I believe my answer to the question
10 was, not necessarily. It doesn't -- it doesn't
11 flow from basic circuits concepts that the output
12 would be different. Once the PA has enough head
13 room, the output is determined by the RF input
14 and the output being the RF output.

15 Q. Turn to Figure 8 of Hau.

16 A. I'm at Figure 8.

17 Q. Would you agree that Figure 8 shows a
18 plot of Pdet versus Vcc2?

19 A. Figure 8 shows in the y-axis Pdet and
20 on the x-axis opt Vcc2.

21 Q. What is opt Vcc2?

22 A. Opt Vcc2 is the optimal Vcc2.

23 Q. Would you agree that every value of
24 Pdet in Figure 8 has a corresponding Vcc2 value?

25 MR. TO: Objection, form.

1 A. It's hard to see below -- opt Vcc2
2 below one volts. Above one volt it looks like
3 there is a single value for Pdet for each opt
4 Vcc2.

5 Q. Is Pdet an indicator of opt Vcc2?

6 MR. TO: Objection, form.

7 A. Pdet is created from the RF input
8 power, input voltage, and -- in the embodiment
9 and Hau -- Hau proposes to set Vcc2 based upon
10 Pdet.

11 Q. Can you turn to Paragraph 125 of your
12 declaration, Pages 61 and 62. In the second
13 paragraph -- or, excuse me, in the second
14 sentence of that paragraph you say that, Hau
15 expressly teaches that prior art devices that
16 "monitor the output power of the power amplifier
17 through the colt -- current in the voltage bias
18 line to the power amplifier" have many
19 undesirable effects, including "coupling loss
20 (typically through a resistor or a current
21 mirror) in the bias line."

22 Do you see that?

23 A. I do see that.

24 Q. Does claim 2 of the '593 patent
25 preclude any measurement of current that creates

1 a coupling loss?

2 MR. TO: Objection, form, scope.

3 A. So Hau discourages taking current
4 measurements and using that measured current to
5 control the bypass switch. Hau expressly teaches
6 that the prior art devices "monitor output power
7 of the power amplifier through the current in the
8 voltage bias line to the power amplifier" have
9 many undesirable effects. And then Hau lists
10 several of those. So this is describing sensing
11 current in the bias line of the power amplifier.

12 Claim 2 is describing an aperture
13 generator that's configured to deactivate a
14 switching device based on a load current at the
15 output voltage node.

16 Q. Does claim 2 require that a load
17 current be measured without coupling loss?

18 MR. TO: Objection, form.

19 A. Claim 2 only requires deactivating the
20 switching device based on a load current so a
21 measurement of a load current at the output
22 voltage node.

23 Q. And that claim does not preclude a
24 measurement that causes coupling loss?

25 MR. TO: Objection, form, asked and

1 answered.

2 A. Once again, all claim 2 requires is to
3 have a control module that deactivates the
4 switching device based on a load current so with
5 a current measurement. That's all that's
6 required.

7 Q. And that claim could be satisfied by a
8 measurement that includes some coupling loss?

9 A. It --

10 MR. TO: Objection, form, asked and
11 answered.

12 A. It just requires deactivating the
13 switching device based on the load current so a
14 measured current. That's all that's required.

15 Q. Can you turn to Page -- Paragraph 141
16 of your declaration on Page 70. And in Paragraph
17 141 you state, Accordingly, the object of Hau is
18 to minimize input current at each output power
19 level of the -- of the power amplifier (not the
20 output current at the load to the DC-DC converter
21 (i.e., the power amplifier)).

22 Do you see that?

23 A. I see Paragraph 141 there, yes.

24 Q. Does claim 1 of the '593 patent require
25 minimizing output current at the load to the

1 DC-to-DC converter?

2 A. The claim relates to determining a
3 predetermined threshold based on a -- related to
4 the power efficiency of a power supply and so to
5 know power efficiency, you would have to know the
6 output power and the input power. So those are
7 the two things you would need to know to
8 understand power efficiency.

9 Q. Would you agree that with all else held
10 e- -- held equal, a lower input current with the
11 same power output would result in greater power
12 efficiency?

13 MR. TO: Objection, form.

14 A. I think you presented a hypothetical
15 power supply where you're keeping the output of
16 the power supply constant and you are keeping the
17 input voltage constant and you're varying the
18 input current so you'd vary the input power. So
19 the ratio of output to input would change with
20 that change in current.

21 Q. Let me ask you a slightly different
22 question. Since you -- you make the statement
23 that Hau's object is, to minimize input current
24 at each output power level of the power amplifier
25 (not the output current at the load of the DC-DC

1 converter).

2 How, in your opinion, is that statement
3 relevant to any claim requirement in the '593
4 patent?

5 A. So this is in the section under claim 5
6 with talking about an "output current at a
7 maximum power efficiency associated with the
8 down-converted input voltage." So claim 5 is
9 related to an output current and Hau is
10 describing the input current to the power supply.

11 Q. So are you interpreting claim 5 to
12 require maximizing the output current?

13 MR. TO: Objection, form,
14 mischaracterizes.

15 A. Claim 5 -- sorry. Claim 5 describes,
16 "configured to provide an output current at a
17 maximum power efficiency associated with the
18 down-converted input voltage." So that's the
19 maximum efficiency and it's talking about an
20 output current. Hau is describing the input
21 current change. It's not describing the output
22 or the power efficiency; it's just describing a
23 change in the input current.

24 Q. Does Hau describe providing an output
25 current from the DC-to-DC converter?

1 A. I think in general, one would
2 understand there's an output current from the
3 DC-to-DC converter.

4 Q. And would you agree that in Figure 5 of
5 Hau, which you have reproduced in the -- in the
6 preceding paragraph of your declaration, that
7 the -- I'll start again.

8 So in -- in -- you also have Figure 5
9 of -- of Hau reproduced on that same Page 70 of
10 your declaration, right?

11 A. That's correct.

12 Q. And Figure 5 of Hau shows two curves,
13 one for a fixed Vcc2 and then a second for an
14 optimum Vcc2; is that right?

15 A. That -- there's two lines labeled,
16 FIXED Vcc2 and OPTIMUM Vcc2.

17 Q. And the -- would you agree that the
18 optimum Vcc2 shows a curve with greater
19 efficiency than the fixed Vcc2 curve?

20 MR. TO: Objection, form.

21 A. No. I would state that Figure 5 is
22 just stating that the current -- just a moment.
23 -- that the current from IBAT is different for
24 the fixed Vcc2 and for the optimal Vcc2.

25 Q. Does the voltage of the supply battery

1 in Hau change?

2 MR. TO: Objection, form.

3 A. In Hau, the battery is a fixed 3.4-volt
4 battery.

5 Q. Can you turn to Paragraph 149 in your
6 DC-to-DC, which is on Pages 74 and 75. And I --
7 this is in the context of your discussion of
8 claim 6 and 12 of the '593 patent; is that right?

9 A. Yes, related to claim 6 and 5.

10 Q. Is that 6 and 5 or 6 and 12?

11 A. I apologize. 6 and 12.

12 Q. And there are a couple of places in
13 that paragraph where you bolded either
14 approximately -- actually, I think they're both
15 approximately. You -- you quote Hau and then
16 bold the -- bold the word approximately where
17 it's describing the relationship between Pdet and
18 optimum Vcc2.

19 Do you see that?

20 A. I apologize. In 146 and 147 I do see
21 bold text. I'm not -- I didn't -- not sure
22 exactly which part you're asking about.

23 Q. So in Paragraph 149, in the second
24 sentence of that paragraph you write, Indeed, Hau
25 discloses, in connection with Figure 8, that "the

1 relationship between the Pdet and optimum Vcc2
2 output from the DC to DC converter is
3 approximately -- and then it gives a formula. I
4 won't read out the numbers but describing a
5 relationship between Pdet and Vcc2, right?

6 A. I do see that in Paragraph 149.

7 Q. And within that portion I just read
8 you've bolded the word approximately for
9 emphasis, right?

10 A. Yes. I have bolded the relationship is
11 approximately Pdet and then the equation.

12 Q. Do claim 6 and 12 require the exact
13 voltage output to be compared to a voltage
14 threshold?

15 A. Well, the -- 6 and 12 describes
16 comparing the down-converter voltage to a
17 threshold voltage. I think a POSITA would
18 understand that as comparing. One would put the
19 two together and see if they were higher or lower
20 than one another.

21 THE VIDEOGRAPHER: We have about five
22 minutes left.

23 BY MR. DAY:

24 Q. Does that comparison have to be with
25 the exact output voltage?

1 MR. TO: Objection, form, asked and
2 answered.

3 A. The claims state, the down-converted
4 voltage, and so that's -- I think a POSITA would
5 understand the down-converted voltage is what
6 needs to be compared.

7 Q. So it's your testimony that -- that
8 claim 6 and 12 would exclude a comparison to a
9 value that approximates the down-converted
10 voltage?

11 A. I think --

12 MR. TO: Objection, form.

13 A. I think 6 and 12 would require a
14 comparison to the down-converted voltage.

15 Q. So we -- you know, you -- I -- this may
16 not be clear from the transcript. I -- I did
17 note that in your last answer, you emphasized the
18 word the when -- when you spoke.

19 Would claim 6 and 12 preclude relying
20 on a comparison to a value that is an indirect
21 indicator of the down-converted voltage?

22 MR. TO: Objection, form.

23 A. 6 and 12 describe -- sorry. -- recite
24 comparing the, emphasis, down-converted voltage
25 to a threshold voltage. So my understanding is a

1 POSITA would read that that the -- the
2 down-converted voltage so the direct voltage from
3 that.

4 Q. Okay. You're interpreting the -- the
5 claim element of -- excuse me. Based on a
6 comparison of the -- the down-converted input
7 voltage to a threshold voltage to require a
8 direct comparison?

9 MR. TO: Objection, form.

10 A. Well, I think a POSITA would understand
11 that you would take a direct measurement of the
12 input voltage, that that would be required.

13 Q. Can you turn to Paragraph 159. In the
14 last -- and I -- just to note the transition,
15 we're now in the section of your declaration that
16 talks about Ground 1B in the petition. In
17 Paragraph 159 of your declaration you state, Sahu
18 offers no other teaching to improve performance
19 based on a specific transmission standard.

20 Do you see that?

21 A. I do see that sentence in the last
22 statement [sic].

23 Q. Is there any claim element of any claim
24 in the '593 patent that requires improving
25 performance based on a specific transmission

1 standard?

2 MR. TO: Objection, form.

3 A. Can you just ask your question one more
4 time so I can make sure I'm clear?

5 Q. Is there any claim element of any claim
6 in the '593 patent that requires improving
7 performance based on a specific transmission
8 standard?

9 A. So I believe in my report -- the -- the
10 section you quoted is the motivation to combine,
11 but in Section -- or I'd say, I guess, Point 2 on
12 Page 83 it discusses claims 3 through 4, 10, and
13 19 with the content, "based on a probable output
14 power point of oper- -- of operation for a
15 selected modulation scheme." And a selected
16 modulation scheme would be understood as one of
17 the many different modulation schemes that are
18 used in radios.

19 Q. Does the claim language that you've
20 just referred to require a device to be capable
21 of controlling the switching device based on more
22 than one modulation scheme?

23 MR. TO: Objection, form.

24 A. So just looking at claim 3 as an
25 example, the aperture generator and control

1 module is configured to control the switching
2 device based on a probable output power point of
3 operation for a selected modulation scheme. And
4 in the '593, Column 6 starting at Line 56, it
5 describes that the -- envisioned is the ability
6 to update on the -- I guess we would say on the
7 fly, but can -- they can be fixed or programmable
8 and thresholds can be downloaded wirelessly so I
9 think that discloses the idea of when it says,
10 output power of operation for a selected
11 modulation scheme, so there's a selected scheme.
12 It should be configured to control the switching
13 device "based on a probable output power point of
14 operation." If a different modulation scheme is
15 selected, then it should operate on that one.

16 Q. And I will note in your last answer I
17 also believe that you -- when you said there's a
18 selected scheme. You -- you emphasized the a
19 selected scheme.

20 Does the -- in order to satisfy the
21 claim, does the device need to be capable of
22 operating under more than one modulation scheme?

23 MR. TO: Objection, form.

24 THE VIDEOGRAPHER: We're going to have
25 to break soon.

1 A. I think a POSITA would understand that
2 this is the modulation scheme that is being used.
3 So for a selected modulation scheme so whatever
4 modulation scheme is being used, the control
5 module should be configured to control the
6 switching device based on a probable output point
7 of operation.

8 MR. DAY: All right. Should we take an
9 in-place recess to change --

10 THE VIDEOGRAPHER: Yeah.

11 MR. DAY: -- tape?

12 THE VIDEOGRAPHER: This -- this is the
13 end of Disc Number 2. The time is 2:53.

14 (Whereupon, there was a recess in the
15 proceedings from 2:53 p.m. to 2:56 p.m.)

16 THE VIDEOGRAPHER: This begins Disc
17 Number 3 in the deposition of Dr. David Ricketts.
18 The time is 2:56.

19 BY MR. DAY:

20 Q. All right. So I think the -- the last
21 question that -- that I -- that I asked you, just
22 since it may not have been clear enough in my
23 question, I was referring to the language in
24 claim 3 about, wherein the aperture generator and
25 control module is configured to control the

1 switching device based on a probable output power
2 point of operation for a selected modulation
3 scheme based on one or more power efficiency
4 characteristics of an electronic device coupled
5 to the power supply. And I think my -- my
6 question was more specific to the -- the phrase a
7 selected modulation scheme within that claim
8 language.

9 Is it -- are you offering any opinion
10 that the phrase a selected modulation scheme in
11 claim 3 requires a power supply configured to
12 operate under more than one modulation scheme?

13 MR. TO: Objection, form.

14 A. Claim 3 just refirms [sic] to the
15 selected modulation scheme.

16 Q. And that could be a single modulation
17 scheme?

18 A. The module's configured and
19 controlled -- control the switching device based
20 on a probable output power point of operation for
21 a selected modulation scheme. And so whatever
22 the selected modulation scheme is.

23 Q. And I'll just note for the record you
24 emphasized the a in a selected modulation scheme.

25 A. For the record, I -- I may have

1 emphasized the a. I -- I'm pointing to the
2 selected so when I emphasized a selected, I'm
3 trying to emphasize selected modulation scheme.

4 Q. All right. I want to really briefly
5 ask you about your opinion about Ground 1C. And
6 I think I asked you some questions earlier about
7 the term MISO amplifier and, obviously, the
8 re- -- the record is what it is, but I think
9 you -- you said something to the effect that you
10 had not necessarily heard that term, but you're
11 familiar with amplifiers with multiple inputs and
12 a single output.

13 Do -- do I recall that right?

14 A. I -- I --

15 MR. TO: Objection, form,
16 mischaracterizes.

17 A. I -- I believe my testimony was I'm
18 familiar with multi-input, multi-output
19 amplifiers. I didn't recall the acronym MISO
20 specifically, but I am familiar with the
21 multiple-input, multiple-output amplifiers.

22 Q. In your -- I'll start again.

23 In your opinion, what is the plain and
24 ordinary meaning of the term MISO amplifier in
25 claim 16 of the '593 patent?

1 A. So a MISO amplifier is an amplifier
2 that has multiple inputs and a single output.
3 And just for clarity, the multiple inputs are not
4 the same signal or the inverse of the same
5 signal. So, for instance, a differential
6 amplifier has two inputs, but it's the same
7 signal, just one's inverted over the other. A
8 MISO amplifier is two signals that aren't copies
9 of one another that go into the amplifier and a
10 single output comes out.

11 Q. All right. So you used the example of
12 a differential amplifier in -- in your answer.
13 In -- in your opinion, would a differential
14 amplifier not be a MISO amplifier?

15 MR. TO: Objection, form, scope.

16 A. A POSITA would understand a
17 differential amplifier has a single input --
18 well, I just pause. This is a hypothetical. I'm
19 envisioning a sin- -- a differential amplifier as
20 a single differential pair so I've got two
21 signals coming in, in plus/in minus is typically
22 how we refer to them, and they relate to the same
23 signal. They're just differential instead of
24 being single ended and so that would be a single
25 input/single output amplifier.

1 Q. Does the claim -- I'll start again.

2 Does claim 16 of the '593 patent
3 contain any requirement about what the sources of
4 the multiple inputs are?

5 MR. TO: Objection, form.

6 A. I believe it does when it states,
7 multiple-input-single-output amplifier. If the
8 two inputs are, for instance, differential, then
9 they wouldn't be a multiple input. It would be a
10 single-input-single-output. That's how we
11 describe those amplifiers in the field.

12 Q. So in -- in your opinion, if a single
13 input signal was processed into separate
14 components which were then provided as inputs to
15 an amplifier, that amplifier would not be a
16 multiple-input-single-output appli- --
17 amplifiers?

18 MR. TO: Objection, form,
19 mischaracterizes.

20 A. In the hypothetical example I was
21 giving, the signal is differential. You can
22 convert from single-ended to differential and
23 feed that into a differential amplifier, but the
24 two signals are related to one another. We often
25 call it in plus/in minus because one's just a

1 inverted version of the other to give immunity to
2 common mode, for instance, but they're the same
3 signal.

4 Q. Okay. In your -- your last answer you
5 said, the two signals are related to one another.
6 Does the claim term MISO amplifier exclude an
7 amplifier that -- that takes as its input two
8 signals that are related to one another?

9 MR. TO: Objection, form and asked and
10 answered.

11 A. To clarify, if I have a differential
12 amplifier, I have two inputs that will have two
13 voltages. Sometimes we call those voltages
14 sig- -- signals. The two voltages are not
15 identical. They're 180 degrees phase shifted to
16 one another to represent a differential signal.
17 It's a single signal. It's just differential.
18 In the MISO amplifier the two signals are
19 different. So just to be clear, you used the
20 word related and my differential amplifier
21 example, the signals are specifically 180 degrees
22 opposite one another because that's how a
23 differential amplifier works. Otherwise, there's
24 no difference in the signals. Whereas in a MISO,
25 the two signals are different.

1 Q. And when you say that the -- that
2 signals have to be different, would that also
3 exclude in-phase and quadrature components of a
4 quadrature signal?

5 MR. TO: Objection, form.

6 A. As a general statement, in phase and
7 quadrature are orthogonal components. One would
8 have to talk about a specific amplifier to
9 discuss how they relate, but just in general, the
10 terms in phase and quadrature are orthogonal.

11 Q. Well, can you turn to Page 180 of
12 your -- or excuse -- sorry. -- Paragraph 180 of
13 your declaration. And there with respect to
14 the -- the Lejon reference you say, Thus, LINC
15 amplifiers like those described in Lejon receives
16 a single input (which are split into two phasor
17 components) and provides a single output.

18 Do you see that?

19 A. I do see that.

20 Q. Are you -- is it your opinion that the
21 phrase MISO amplifier excludes receiving inputs
22 that are derived from a single output which has
23 been split into phasor components?

24 MR. TO: Objection, form,
25 mischaracterizes.

1 A. It's my opinion that Lejon discloses
2 a -- a LINC out-phasing amplifier system where an
3 input signal, one signal, is applied and then the
4 amplifier processes that signal. It amplifies it
5 and it outputs a single output. So in that
6 context, it discloses a single signal coming in
7 and a single output signal going out.

8 Q. When the -- so when the amplifier --
9 I'll start again.

10 If the two inputs provided to the
11 amplifier are phasor components of a -- derived
12 from a single si- -- signal, your opinion would
13 be that those do not constitute the multiple
14 inputs required for a MISO amplifier?

15 MR. TO: Objection, form, asked and
16 answered.

17 A. So once again, in Lejon in Paragraph
18 179, as I cite, it discloses a single input
19 signal coming into the power amplifier and then
20 it does what it does in the signals and output of
21 the power amplifier is a single output signal,
22 whereas a MISO amplifier would be an amplifier
23 that has two different inputs.

24 Q. And I think at the very beginning of
25 the -- this deposition, I -- I asked you some

1 questions about whether you'd reviewed some of
2 the other patent documents cited within the '593
3 patent, and I wanted to ask you a more specific
4 question about that.

5 In Column 10 of the '593 patent at
6 Lines 17 through 22 the '593 patent states,
7 Further, the switching power supply (with
8 optional bypass switch architecture) can be
9 designed to operate with and optimize the system
10 efficiency of any of the MISO amplifier
11 architectures and schematics shown in a related
12 U.S. patent application Serial Number 11/256,172
13 and 11/508,989.

14 Do you see that?

15 A. I do see that.

16 Q. In the course of preparing your
17 declaration you provided in this IPR, did you
18 review either of those patent applications?

19 A. I looked at both. I think I recall the
20 '989 more recently.

21 Q. Did you look at that prior to your
22 declaration?

23 A. Yes.

24 MR. TO: Objection, form.

25 BY MR. DAY:

1 Q. All right. Can you turn to Exhibit
2 1011, the Canyon reference.

3 A. I'm there.

4 Q. And turn to Figure 1, please.

5 A. All right. I'm at Figure 1.

6 Q. And Figure 1 depicts a power amplifier
7 150, correct?

8 A. The '511 patent, sorry. So this would
9 be the -- 111 [sic] Canyon describes 150 as a
10 power amplifier.

11 Q. What is the power supply for the power
12 amplifier 150 in Figure 1 of that Canyon
13 reference?

14 MR. TO: Objection, form.

15 A. It discloses a power management unit
16 110 and a regulator 160 and the 160 creates the
17 voltage Vbb which is connected to the PA.

18 Q. Is the voltage Vbb the power that is
19 being consumed by the power amplifier 150?

20 MR. TO: Objection, form.

21 A. Vbb is the operating voltage of the
22 power amplifier.

23 Q. How is the power consumption of the
24 power amplifier 150 in -- in Canyon measured --
25 in Figure 1 of Canyon?

1 MR. TO: Objection, form.

2 A. I think you'd have to point me to
3 something specific. Vbb is the operating
4 voltage. That voltage and the current to the
5 power amplifier would be its total power being
6 consumed.

7 Q. How is the power -- I'll start again.

8 Does the power meter 180 measure the
9 power consumption of the power amplifier in
10 Canyon?

11 MR. TO: Objection, form.

12 A. I believe Figure 1- -- 180 has a
13 scrivener's error. In the Column 3 on Line 14 it
14 refers to the 180 as, A current monitor --
15 current meter, and I believe that paragraph
16 consistently re- -- refers to it as current. And
17 so that monitors the current into the PA.

18 Q. And is the current in the PA indicative
19 of the power consumption of the PA?

20 MR. TO: Objection, form.

21 A. I think we discussed previously if you
22 know the continuous time voltage, continuous time
23 current, you can calculate the power into the PA.

24 Q. All right. Going back to Figure 1
25 of -- of Canyon, you see Figure 1 shows a

1 regulator 160.

2 Do you see that?

3 A. I do see that.

4 Q. What is the function of the regulator
5 160?

6 A. Switching regulator 160 receives a
7 supply voltage Vcc of a predetermined voltage
8 level and outputs an operating voltage Vbb to the
9 power amplifier.

10 Q. And which portion of the --

11 A. I apologize. So that would be Column
12 3, Line 11 through 13.

13 Q. Okay. How is the regulator 160
14 controlled?

15 MR. TO: Objection, form.

16 A. Column 3, Line 35, The operating
17 voltage Vbb output by the regulator 160 to the
18 power amplifier 150 is determined in accordance
19 with the control signal Z output by the
20 controller 170.

21 Q. Turn to the bottom of -- of Column 3 at
22 Line 66. You see there it describes that,
23 Regulator 160 receives a supply voltage Vcc of a
24 predetermined voltage level and outputs an
25 operating voltage Vbb to the power amplifier 160?

1 Do you see that?

2 A. I do see those lines in Column 3 and 4.

3 Q. And is that a description of the
4 control of the regulator 160 in Figure 1?

5 A. This is --

6 MR. TO: Objection, form.

7 THE WITNESS: Sorry.

8 A. This is referring to the embodiment in
9 Figure 2.

10 Q. What is the basis of your opinion that
11 description applies exclusively to Figure 2?

12 MR. TO: Objection, form.

13 A. Figure 2 shows a block diagram
14 illustrating a power amplifier. It continues to
15 talk about Figure 2. At Line 55 it describes the
16 power meter measures the power output. So if we
17 look at Figure 2, there's a power meter 181 at
18 the output. So these paragraphs are all talking
19 about Figure 2. Then it describes the indicator
20 signal X is then provided to the controller.
21 Controller receives the signal X, in turn,
22 generates Z and bypass signal Z prime. Control
23 signal Z depends upon the value of the power
24 output indicated signal X.

25 And then it goes further into the

1 paragraph below, Regulator 160 receives a supply
2 voltage Vcc of a predetermined level and outputs
3 operating voltage Vbb of the power amplifier. So
4 these paragraphs are all describing Figure 2.

5 Q. So -- I see. So is your basis for
6 those -- your opinion that those paragraphs refer
7 exclusively to Figure 2 just that they appear
8 after the introduction to Figure 2 in the
9 specification of Canyon?

10 MR. TO: Objection, form,
11 mischaracterizes.

12 A. I wouldn't characterize it as an
13 introduction. I -- I -- I read through each of
14 those paragraphs. They're describing the
15 components in Figure 2, describing specific
16 components such as a power meter 180 measures the
17 output power of the amplifier. That's in Line 55
18 of Column 3. That is in Figure 2. It is not in
19 Figure 1. And then it further describes the
20 components that it listed above for Figure 2.

21 Q. Okay. So with -- with respect to Lines
22 55 through 57, you're -- you said that because
23 that refers to the output of the power amplifier,
24 you're interpreting that as -- as coming from
25 Figure 2, correct?

1 MR. T0: Objection, form.

2 A. Once again, on 43, Column 3 begins
3 describing Figure 2. It describes components of
4 Figure 2, power amplifier 150, for instance. And
5 then the next paragraph continues to talk about
6 elements like the power meter 180, which in
7 Figure -- it describes as measuring the power at
8 the output of the power amplifier and generates a
9 power output signal X.

10 Q. So starting at -- at Paragraph -- at
11 Column 3, Line 66, you'd agree that there is a
12 regulator 160 in both Column 1 and Figure 2,
13 correct?

14 MR. T0: Objection, form.

15 A. Could you reask it? I'm not sure that
16 question was...

17 Q. Column 3, Line 66 of Canyon refers to a
18 regulator 160.

19 Do you see that?

20 A. That's correct.

21 Q. And you would agree that that appears
22 in both Figure 1 and Figure 2?

23 A. Fig- --

24 MR. T0: Objection, form.

25 A. Figure 1 has a block labeled, 160, and

1 Figure 2 also has a block labeled, 160.

2 Q. The Column 4, Line 1 refers to a power
3 amplifier 150, correct?

4 A. That is correct.

5 Q. And there are blocks labeled as power
6 amplifier 150 in both Figure 1 and Figure 2?

7 A. There is a -- a block 150 in Figure 1
8 and in Figure 2.

9 Q. Column 4 goes -- then goes on to say,
10 the operating voltage Vbb output -- output to the
11 power amplifier 150 is determined in accordance
12 with the control signal Z and bypass signal Z
13 prime output by controller 170.

14 You see that?

15 A. I do see that.

16 Q. And would you agree that there's a
17 controller 170 with outputs Z and Z prime in both
18 Figure 1 and Figure 2?

19 A. Figure 2 has a box 170 marked,
20 CONTROLLER, with an output Z and Z prime and
21 Figure 1 has a box marked, CONTROLLER, labeled
22 170 and it has an output Z and Z prime.

23 Q. And in Column 4 starting at Line 8 it
24 says, In a preferred embodiment, the regulator
25 160 outputs an operating voltage Vbb to the power

1 amplifier unit 120.

2 Do you see that?

3 A. I do see that.

4 Q. And both Figure 1 and Figure 2 have a
5 regulator 160 that outputs a -- an operating
6 voltage Vbb to an -- a power amplifier 120,
7 correct?

8 A. Figure 2 has a regulator 160 that
9 provides Vbb to 120 and Figure 1 has regulator
10 labeled, 160, outputs a signal to a power meter,
11 and then continues to the PA as Vbb, and
12 that's -- 120 is the PA system.

13 Q. All right. Can you turn to Paragraph
14 196 of your declaration on Page 98. Let me know
15 when you're there.

16 A. I am there.

17 Q. In the second sentence of that
18 paragraph you state, With respect to the Figure 2
19 embodiment, Canyon's teaching on how to set this
20 bypass threshold is complete.

21 Do you see that?

22 A. I do see the -- those words on the
23 page.

24 Q. And is the basis of that opinion the
25 fact that Canyon teaches operating a bypass

1 function within a range of 22 to 24 dBm?

2 MR. TO: Objection, form.

3 A. So your question is -- with respect to
4 Figure 2, Canyon describes specifically when a
5 specific- -- specifically when to close the
6 switch. When the power amplifier unit is
7 consuming a power level greater than 22 to 24
8 dBm.

9 Q. We talked earlier about how dBm is a
10 logarithmic scale; is that right?

11 A. That is correct.

12 Q. And 22 -- would it sound reasonable to
13 you that 22 dBm would be about 159 or 160
14 milliwatts?

15 A. 20 dBm is a hundred so 200 is 23 dBm so
16 around -- around there.

17 Q. Yeah. And would it sound reasonable to
18 you that 24 dBm is about 250 milliwatts?

19 A. That would be consistent with 23 dBm
20 being 200 so it would be higher than 200. So if
21 that's the calculation you've done, I assume it's
22 correct. I haven't done it.

23 Q. Yeah. So as measured in milliwatts, 22
24 to 24 dBm is a range of -- it's almost 60
25 percent; is that right?

1 MR. TO: Objection, form.

2 A. I'd have to look at the -- the math,
3 but certainly, 22 is less than 200 and 24 is
4 greater than 200 so it would be -- I don't recall
5 the numbers you gave, but it would be a variation
6 around 23, which is 200.

7 Q. Does your declaration identify any
8 teaching in Canyon that would specify where
9 exactly within a -- that range of 22 to 24 dBm
10 the bypass threshold should be set?

11 MR. TO: Objection, form.

12 A. Canyon just provides the 22 to 24 dBm,
13 which for an RF signal is a narrow range because
14 RF is logarithmic.

15 MR. DAY: All right. Can we go off the
16 record?

17 THE VIDEOGRAPHER: Off the record at
18 3:25.

19 (Whereupon, there was a recess in the
20 proceedings from 3:25 p.m. to 3:35 p.m.)

21 THE VIDEOGRAPHER: Back on the record
22 at 3:35.

23 MR. DAY: Dr. Ricketts, thank you for
24 your testimony. I don't have any further
25 questions at this time so subject to any

1 questioning that your counsel may have, that's
2 the conclusion of my questions and I'll pass the
3 witness.

4 MR. TO: ParkerVision has no further
5 questions for the witness.

6 THE VIDEOGRAPHER: And this clude --
7 concludes this deposition for today. Time is
8 3:36.

9 (Whereupon, the deposition of DAVID
10 RICKETTS, PH.D., concluded at 3:36 p.m., November
11 3, 2025.)

12 (Read and sign requested.)
13
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1 CERTIFICATE OF COURT REPORTER

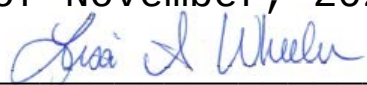
2 North Carolina

3 Wake County

4 I, Lisa A. Wheeler, RPR, CRR, Notary Public
5 in and for the State of North Carolina, certify
6 that on November 3, 2025, in Raleigh, North
7 Carolina, DAVID RICKETTS, PH.D., having produced
8 satisfactory evidence of identification and
9 having been first duly sworn by me to tell the
10 truth, thereupon testified as set forth in the
11 preceding 171 pages, exclusive of errata sheet
12 and signature page, if required, the examination
13 being reported by me verbatim and reduced to
14 typewritten form by me personally.

15 I further certify that I am not of counsel
16 or in the employ of the parties to this action;
17 that I am not related by blood nor connected by
18 marriage to the parties of this action; that I am
19 not interested in the outcome thereof; that the
20 foregoing is a true and accurate transcript of
21 said proceeding to the best of my ability and
22 understanding.

23 This the 11th day of November, 2025.

24 
25 _____
Lisa A. Wheeler, RPR, CRR
Notary Public, #19981350007

1 VERIFICATION OF DEPONENT

2 I, DAVID RICKETTS, PH.D., have read the
3 foregoing deposition testimony, which was
4 reported by Lisa A. Wheeler, RPR, CRR, and Notary
5 Public in and for the State of North Carolina, on
6 November 3, 2025.

7 I find the transcript of my testimony
8 to be true and accurate according to my testimony
9 on that date, with the exception(s) and/or
10 addition(s), if any, reflected on the attached
11 errata page, which was completed by me.

12
13 _____
14 DAVID RICKETTS, PH.D. DATE

15
16
17 Sworn and subscribed to before me this _____ day
18 of _____, 2025.

19
20 _____
21 Notary Public

22 My commission expires: _____
23
24
25

ERRATA SHEET

I, DAVID RICKETTS, PH.D., do hereby certify that I have read the foregoing transcript of my testimony, and further certify that it is a true and accurate record of my testimony (with the exception of the corrections listed below):

Page	Line	Correction
------	------	------------

[illegible]

DAVID RICKETTS, PH.D.

Focus Litigation Solutions
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Sacramento, CA 95814
Telephone (916) 228-4593
Production@FocusLitigationSolutions.com

November 12, 2025

David Ricketts, Ph.D.
c/o Anderson To, Esq.
8229 Boone Boulevard, Suite 450
Vienna, VA 22182

Re: Mediatek, Inc. v. Parkervision, Inc.
Date of Deposition: November 3, 2025

The transcript of your deposition taken in the above-entitled matter has been transcribed. The original transcript will be held for 35 days from the date of this letter before it is sealed and forwarded to the noticing attorney.

You have the right to review, sign and make corrections to your transcript within the 35-day period. Please call the above number, or e-mail to make an appointment for your review. It is our policy not to release the original transcript and complimentary copies are not provided.

If you are represented by an attorney, we advise that you contact your attorney to discuss this matter. If you are an independent witness and have questions, please contact the attorney who requested you to testify or this office for further instructions.

If you wish to waive signature, please sign and date below and return this letter to the above address. In the event you have not read, corrected, and signed your deposition within (30) days of receipt of this letter, it may be used with the full force and effect as though it had been read, corrected, and signed.

Cc: All counsel

DATE

David Ricketts, Ph.D.

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generic (1)	< I >	instantaneous (2)	learned (1)
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goal (2)	identify (4)	introducing (1)	lexicography (2)
goes (8)	ig (1)	introduction (2)	life (3)
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Good (6)	illustrated (2)	inventor (1)	limitation (13)
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greater (18)	immunity (3)	involve (2)	limits (2)
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happens (4)	including (3)	ju (1)	lists (1)
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lower (9)	minus (8)	needed (3)	opposite (1)
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main (1)	miscate (1)	network (4)	optimized (5)
maintain (2)	mischaracterize (1)	never (1)	optimizing (2)
making (3)	mischaracterizes (24)	node (19)	optimum (5)
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