

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD
4
5 MICRON TECHNOLOGY INC.,
6
7 Petitioner
8
9 v.
10 SONRAI MEMORY LIMITED,
11
12 Patent Owner
13
14
15 Case IPR2023-00909
16
17 Patent No. 6,724,241
18
19
20 ORAL DEPOSITION OF
21 MICHAEL C. BROGIOLI, Ph.D.
22 Austin, Ex
June 5, 2024 – 9:06 a.m.

Reported by:
Micheal A. Johnson, RDR, CRR

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ORAL DEPOSITION OF MICHAEL C. BROGIOLI,
Ph.D., produced at the instance of the Petitioner,
in the above-styled and numbered cause on the
5th day of June, 2024, at 9:06 a.m., before Micheal
A. Johnson, RDR, CRR, Notary Public in and for the
State of Texas, reported by realtime stenographic
means, at the offices of Fish & Richardson, P.C.,
111 Congress Avenue, Suite 2000, Austin, Ex,
pursuant to 37 C.F.R. § 42.53.

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June 5, 2024

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1	DEPOSITION EXHIBITS		
2	MICHAEL C. BROGIOLI, Ph.D.		
3	June 5, 2024		
4	NUMBER	DESCRIPTION	MARKED
5	Exhibit 1	Patent Owner's Response	87

* * * * *

10	PREVIOUSLY MARKED EXHIBITS		
11	NUMBER	DESCRIPTION	PAGE
12	MTI-1001		29
13	MTI-1003		35
14	MTI-1005		154
15	MTI-1008		141
16	MTI-2013		9

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1 PROCEEDINGS

2 MICHAEL C. BROGIOLI, Ph.D.,
3 called as a witness, having been duly sworn by a
4 Notary Public, was examined and testified as
5 follows:

6 EXAMINATION

7 BY MR. RIFFE:

8 Q. Good morning, sir.

9 A. Good morning.

10 Q. Would you please state your name for the
11 record.

12 A. Yes. It's Michael Charles Brogioli.

13 Q. And could you please provide a business
14 address for the record.

15 A. It is 501 Congress Avenue, suite 150, and
16 that's in Austin, Texas 78701.

17 Q. Could you provide your home address for
18 the record.

19 A. It is 3420 Mount Barker Drive, Austin,
20 Texas 78731.

21 Q. And I know you've been deposed before
22 because we were together last week, but

1 approximately how many times have you been deposed,
2 Dr. Brogioli?

3 A. I think it's in the range of 50 or 50
4 something.

5 Q. Just to go over some ground rules, again,
6 just so that the court reporter can write down
7 everything we're saying, please provide verbal
8 answers. Is that okay for today?

9 A. Yes.

10 Q. You understand you've been given an oath
11 to tell the truth as if you'll be testifying in a
12 court of law or before the PTAB?

13 A. Yes.

14 Q. And you agree to do that today?

15 A. Yes, I do.

16 Q. You're permitted to speak to your counsel
17 during breaks, but not about the substance of your
18 testimony. Do you understand that?

19 A. Yes, I do.

20 Q. And your attorney may make limited
21 objections today, but do you understand unless
22 you're instructed to do so and you choose not to

1 answer, you're obligated to answer to the extent
2 you're able to do so?

3 Do you understand that?

4 A. Yes, I do.

5 Q. If you don't understand a question, will
6 you please let me know, otherwise for the record it
7 will be as if you understood the question; is that
8 correct?

9 A. Okay. Yes.

10 Q. Any reason you can't provide your best,
11 most accurate testimony today?

12 A. No.

13 Q. Any medical conditions that may impact
14 your ability to testify?

15 A. No.

16 Q. Anything that might impact your ability
17 to testify today?

18 A. Not that I'm aware of, no.

19 Q. If this changes during the deposition,
20 will you let me know?

21 A. I will.

22 Q. You've testified at trial before as well,

1 correct?

2 A. That's correct.

3 Q. Approximately how many times?

4 A. I think it's six or seven.

5 Q. Are those -- strike that.

6 Is your trial testimony reflected in your
7 CV that's attached to your declaration submitted in
8 this case as Exhibit 2013?

9 A. Yes, it should be.

10 Q. Before this matter, had you ever done any
11 work for Sonrai, the patent owner?

12 A. I had, yes.

13 Q. And what was that work?

14 A. There is another IPR that we had a
15 deposition on last week for a '527 patent, and then
16 I think I handled an IPR related to the patent we're
17 talking about today, the '241, approximately two
18 years ago, something like that.

19 Q. Do you recall what that IPR with respect
20 to the '241 patent was?

21 A. I don't recall all of the parties that
22 may have been a part of that.

1 Q. Do you recall any of the parties other
2 than Sonrai that might have been a part of that?

3 A. Specifically, no. It should be on my CV,
4 though.

5 Q. Do you recall if Kioxia was one of the
6 parties in that IPR?

7 A. That sounds right. I don't recall how to
8 spell it.

9 Q. I believe it's K-i-o-x-i-a. Does that
10 sound right?

11 A. That sounds right.

12 Q. Were you deposed during that IPR in the
13 '241 proceeding -- IPR proceeding?

14 A. I was, yes.

15 Q. And you were deposed by one of the
16 petitioner's counsel, I presume, in that case?

17 A. That's my recollection.

18 Q. Do you know what the outcome of that IPR
19 was?

20 A. I don't. As I recall, my deposition was
21 very brief, but I don't recall the outcome.

22 Q. Do you understand that the patents were

1 apparently sold or assigned to a company called Nera
2 Innovations earlier this year?

3 A. I recall you mentioning that name last
4 week, but I don't know the back story there.

5 Q. Before the matter -- this matter in the
6 IPR, had you done any work for Nera?

7 A. I don't think so, no.

8 Q. Other than the IPR in the '527 patent
9 that we had your deposition for last week and the
10 prior IPR in the '241 patent, had you done any work
11 for Sonrai in the past?

12 A. There's a district court litigation that
13 involves this '241 patent and the '527 that we
14 discussed last week that I'm working on as well.
15 That deposition's Friday of this week.

16 Q. You've submitted expert reports in that
17 district court litigation; is that correct?

18 A. That's correct.

19 Q. To your knowledge or your recollection,
20 are your positions taken in your expert report in
21 the district court case consistent with your
22 declaration you've submitted in this IPR proceeding

1 with respect to the '241 patent?

2 A. Yes. I'm not aware of differences there.

3 Q. Now, based on our discussion last week, I
4 understand you have a couple of companies that
5 you're affiliated with; is that correct?

6 A. That's correct.

7 Q. And could you provide the names of those
8 companies for the record?

9 A. Sure. There's Polymathic Consulting,
10 which is an umbrella that I do my consulting work
11 under as well as other types of technical work.
12 There's a company called AgCompute, A-G, Compute,
13 that is developing technology for intelligent drone
14 and location services in agriculture and automation
15 that I'm a named inventor on the technology.

16 Another company called Network Native
17 that's building technology for Internet of Things
18 type -- not specific applications, but technical
19 development, if you will. And then there have been
20 other companies I've been on advisory boards and
21 things of that nature. One that I may still be on
22 is Tandem. They do hybrid vehicle technology. I

1 think that's most of it.

2 Q. With respect to Polymathic, AG Computing,
3 Network Native, Tandem, have any of those companies
4 done work for the patent owner Sonrai or Nera in the
5 past, to your knowledge?

6 A. I would say just my consulting firm and
7 the matters we just discussed.

8 Q. And your consulting firm being Polymathic
9 Consulting; is that right?

10 A. That's right.

11 Q. So in terms of invoicing your work that
12 you do related to the IPRs in this matter of the
13 '241 patent and the '527 patent in the district
14 court litigation, do you invoice Sonrai from
15 Polymathic Consulting?

16 A. Yes. Technically I think the invoices go
17 to someone at John's firm.

18 Q. Okay.

19 A. And then magically come back to me.

20 Q. But the invoices are distributed to the
21 firm for the -- to the lawyers for Sonrai from
22 Polymathic Consulting; is that correct?

1 A. That's correct.

2 Q. Do you have an estimate of how much you
3 have invoiced Sonrai for with respect to the '241
4 IPR that we're discussing here today?

5 A. I would say -- I'd want to refer back to
6 the invoices because the work between the district
7 matter or the IPR or the multiple IPRs, it's a bit
8 difficult to keep track of the time in my head.
9 More than 50 hours. I'm not sure of what an upper
10 limit might be on that, but it should definitely be
11 in the invoices.

12 Q. Do you have an approximation of how many
13 hours you've spent in total between the two IPRs and
14 the litigation?

15 A. I don't. It would be -- I wouldn't be
16 surprised if it was north of 100 or maybe 200 hours
17 or something like that. But it should all be broken
18 down in those invoices.

19 Q. Is it normal for you to act as an expert
20 in both the district court litigation as well as the
21 IPR context?

22 MR. PETERSORIC: Objection to form.

1 A. I don't think so. I've been contacted to
2 work on specifically IPRs in the past, or just on
3 the litigation side of things.

4 BY MR. RIFFE:

5 Q. Do you have a preference?

6 A. A preference for what?

7 Q. Which type of work you do, either
8 litigation support or IPR support.

9 A. Not particularly. I always find the
10 engineering analysis of different products and
11 things interesting that doesn't come into the IPRs,
12 but I don't have a -- necessarily have a preference.

13 Q. Before this matter in the litigation --
14 before those IPR matters and the litigation, have
15 you had any past associations with Micron Technology
16 Inc.?

17 A. I have worked on either IPRs or -- and
18 litigations where they were averse to Micron -- or I
19 guess Micron filed an IPR against the party I was
20 working on behalf of.

21 Q. And was that party Netlist?

22 A. At least in one case, yes.

1 Q. Do you recall who the other parties you
2 worked for adverse to Micron?

3 A. To the extent there were other parties,
4 it would be on my CV, but I don't recall from
5 memory. And I -- many years ago there may have been
6 some involvement with a research group I was in at
7 Rice that there may have been Micron funding or
8 something many years ago, but I don't recall
9 specifics.

10 Q. You don't recall what the specific
11 project was that Micron funded at Rice University?

12 A. To the extent they did fund something in
13 the lab that I was in, I'm thinking of the 2002, '3,
14 '4 time frame. I don't know that I was specifically
15 working on it, but something rings a bell there.

16 Q. Do you recall how much funding Micron
17 provided for that project?

18 A. No.

19 Q. Were you the lead researcher on that
20 project that Micron funded?

21 A. So to the extent there was a project that
22 they funded, no, I would not have been the lead on

1 it.

2 Q. Do you recall who might have been?

3 A. Maybe someone of the name Scott Rixner,
4 R-i-x-n-e-r, maybe.

5 Q. Do you know what role Scott Rixner plays
6 at Rice University?

7 A. I think these days he is in -- he was in
8 electrical engineering and computer engineering and
9 computer science. I think he may be in the -- both
10 or all three departments still. I don't know his
11 official title these days.

12 Q. And you're an adjunct professor at Rice
13 University still, correct?

14 A. That's correct.

15 Q. What do you teach?

16 A. Typically graduate student-level
17 doctorate-facing-level research topics. So things
18 in circuit design or computer architecture. We've
19 discussed things like emerging telecom standards,
20 things like that. And then I have had involvement
21 in other sort of nonteaching projects along the way
22 as well.

1 Q. Are you currently teaching at Rice
2 University?

3 A. Not right now, no.

4 Q. When is the last time you taught a class?

5 A. I think the last time I was actively
6 doing a module was maybe a year ago or so. We're
7 discussing some possible new curriculum for 2025,
8 but it's still up in the air. But it will be fun if
9 we can do it.

10 Q. Through your work at Polymathic
11 Consulting, have you consulted with other memory
12 manufacturers outside of Sonrai and Micron?

13 A. So I would say I've probably consulted
14 for other companies in the memory space. One would
15 be Netlist. I think I'm doing some work with
16 Western Digital. There are probably others in there
17 that would all be on the CV.

18 Q. Have you done any work, either through
19 Polymathic or any of your other affiliations for SK
20 Hynix?

21 A. I don't think I've worked on behalf of SK
22 Hynix. I think at one point in time I may have

1 worked on something that was averse to them in a
2 litigation.

3 Q. Do you know Dr. Liu -- I'm sorry, strike
4 that.

5 Do you know Dr. Baker, Jamie Baker, who
6 has submitted an expert declaration on behalf of
7 Micron in this matter?

8 A. I do.

9 MR. PETRSORIC: Objection, form.
10 BY MR. RIFFE:

11 Q. And what's your relationship with
12 Dr. Baker?

13 A. I'm aware -- he and I, I believe, worked
14 together -- or on the same -- on behalf of the same
15 client in a memory technology matter that I think
16 was at the International Trade Commission, and I
17 think we've probably been on opposite sides in the
18 past as well.

19 Q. And who was that client in the memory
20 technology matter that you worked with Dr. Baker on
21 at the ITC?

22 A. I think it was Netlist some years back.

1 Q. And at the time was Dr. Baker an expert
2 for Netlist as well?

3 A. I don't want to speak for him, but my
4 recollection is he was.

5 Q. Do you know who was on the opposite side
6 of that case party-wise from Netlist in the ITC
7 matter?

8 A. So it will be on my CV. It may have been
9 SK Hynix, but I don't recall.

10 Q. When did you start working on this matter
11 for Sonrai?

12 A. For this IPR I think it would have been
13 the beginning of the year. Just going from memory,
14 maybe in the -- if we're in -- what are we in, June
15 now? Maybe the February-ish time frame.

16 Q. And who first approached you to work on
17 this IPR matter on behalf of Sonrai?

18 A. It would have been someone at
19 Mr. Petrusic's firm. I don't recall specifically
20 who.

21 Q. And was this after you had been retained
22 to work on the IPR matter in the '527 patent we

1 discussed last week?

2 A. Going from memory, I think they were both
3 at the same time.

4 Q. And at the time you were approached to
5 work on the IPR matters related to the '527 and '241
6 patent, were you also asked to work on the
7 litigation at that time?

8 A. I don't remember.

9 Q. Do you recall being asked -- being
10 retained to work on the litigation prior to being
11 retained to working on the IPRs in these matters?

12 A. I don't recall. Hopefully that should be
13 in my invoices.

14 Q. Sitting here today, you don't recall
15 whether you were retained to work on the litigation
16 prior to being retained to work on the IPRs in this
17 matter?

18 A. Yeah, I don't recall if there was -- one
19 was before the other or perhaps if they were at the
20 same time.

21 Q. Do you recall doing any work with Sonrai
22 or its counsel in preparation of the complaint that

1 was filed against Micron in the copending
2 litigation?

3 A. Not that I recall, no.

4 Q. So you weren't asked to do any analysis
5 that led to the filing of the complaint against
6 Micron in this case, to your recollection?

7 A. I would say that I don't remember if I
8 had done some patent or engineering analysis or
9 something of that prior to a complaint being filed.
10 I might not have been aware of other things going
11 on.

12 Q. Once you were retained by Sonrai, what
13 did Sonrai ask you to do with respect to the IPR
14 that we're talking about today, the '241 IPR?

15 A. It was to look at the patent -- the '241
16 patent and statements that were made by Dr. Baker
17 and probably some other materials and to offer
18 opinions to certain of the arguments that Dr. Baker
19 had made.

20 Q. And I misspoke. I said Dr. Baker. It's
21 actually Dr. James Dickens --

22 A. That's right.

1 Q. -- who submitted that declaration. So I
2 apologize for that for the record.

3 Do you know Dr. James Dickens?

4 A. I don't believe so. The name sounded a
5 little familiar, but I don't think I've ever met
6 him.

7 Q. So it's fair to say, then, when you
8 testified earlier about patent -- looking at the
9 '241 patent and statements that were made by
10 Dr. Baker, you were referring to actually
11 Dr. Dickens with respect to the IPR, correct?

12 A. That's correct, yes.

13 Q. Did anyone at Polymathic help you with
14 your work related to the IPR that we're discussing
15 today concerning the '241 patent?

16 A. No.

17 Q. Did anyone help you form your opinions
18 with respect to the '241 patent that are reflected,
19 for example, in your declaration that you submitted
20 in this IPR matter?

21 A. No, they didn't.

22 Q. Did anyone at your other companies that

1 you're affiliated with that you testified to earlier
2 provide any input as to your opinions with respect
3 to the '241 patent in this IPR proceeding?

4 A. No.

5 Q. In preparation for your deposition today,
6 did you have an opportunity to meet with your --
7 Sonrai's counsel to prepare for your testimony?

8 A. Yes, I did. We met yesterday afternoon.

9 Q. Approximately how long did you meet?

10 A. I think maybe two hours or so. We may
11 have spoken via phone previous to that, maybe the
12 day before.

13 Q. And about how long was that phone call?

14 A. I think it would have been fairly quick,
15 maybe 15 minutes or something like that.

16 Q. And do you recall who specifically you
17 met with yesterday to prepare for your deposition?

18 A. Mr. Petrusic, who's here today.

19 Q. And was he the same counsel you spoke to
20 on the phone for about 15 minutes the other day in
21 preparation for your deposition?

22 A. That's right, yes.

1 Q. Did you speak to anyone else in preparing
2 for your deposition today other than Mr. Petrsoric?

3 A. No.

4 Q. Did you speak to anyone at Sonrai or Nera
5 in preparation for your deposition?

6 A. No.

7 Q. Have you ever met any of the principals
8 at Sonrai or Nera?

9 A. Not that I recall, no. Not in connection
10 with this matter anyway.

11 Q. In connection with any other matter, have
12 you met with any of the principals at Sonrai or
13 Nera?

14 A. I don't think so, no.

15 Q. Did you review any documents in preparing
16 for your deposition today?

17 A. Yes. My declaration and the patent and
18 the prior art references that I discuss in my
19 declaration.

20 Q. And I see you have a couple of documents
21 in front of you today. Can you describe for the
22 record what those are?

1 A. Sure. So I have unmarked clean copies of
2 my declaration, the '241 patent, and then the Buti
3 reference, the Doluca reference, the Hosono
4 reference, the Le reference, and I believe this is
5 the Ujiie reference, U-j-i-i-e.

6 Q. And you testified that those are clean
7 copies, they have no annotations or markings; is
8 that correct?

9 A. That's correct.

10 Q. Anything else that you reviewed in
11 preparation for your deposition today?

12 A. I may have looked at portions of
13 Dr. Dickens' declaration as well.

14 Q. And did you review the patent owner
15 response that Sonrai/Nera submitted in this IPR
16 proceeding?

17 A. At some point I would have looked at it.
18 I don't know that I specifically looked at it
19 yesterday.

20 Q. And why did you look at it at some point?

21 A. It probably would have been part of maybe
22 some initial documents that were given to me. For

1 instance -- or I would say it's often the case that
2 I'll get a copy of a petitioner's document, and
3 maybe their expert's declaration and prior art
4 references that their expert cites and things like
5 that. It may have been part of that.

6 Q. Did you have -- did you play any role in
7 the preparation of the patent owner's response
8 submitted in this IPR proceeding?

9 A. Not that I'm aware of, no.

10 Q. Well, you said that you were retained for
11 this IPR proceeding in the '241 patent in the
12 February 2024 time frame; is that correct?

13 A. I think that sounds right.

14 Q. And you have a copy of your declaration
15 in front of you, is that right, which is
16 Exhibit 2013 to the IPR proceeding?

17 A. Yes, I do.

18 Q. If you'd turn to the last page. Is that
19 your signature on page 46 of the declaration?

20 A. Yes, it is.

21 Q. And that's dated March 11th, 2024; is
22 that correct?

1 A. That's right.

2 Q. And so is it fair to say that by the time
3 you were retained for the case in February 2024, you
4 had approximately one month to prepare your
5 declaration that was submitted in this proceeding as
6 Exhibit 2013?

7 A. So as I'm looking at the date, it may
8 have been slightly earlier than February. Again,
9 I'd have to go back to the invoices. But I had --
10 for the '241 had seen this patent and some of the
11 references previously, at least in that other IPR we
12 were discussing.

13 Q. So just going back to the question I
14 asked about the role in preparation of the patent
15 owner's response, you said that you weren't aware of
16 any role that you played. Did you review the patent
17 owner response, a draft, before it was submitted to
18 the PTAB in this proceeding?

19 A. I don't think so, no.

20 Q. You said you had the '241 patent in front
21 of you, a copy of that; is that correct?

22 A. Yes.

1 Q. Which is Micron 1001 in the IPR
2 proceeding, for the record.

3 A. Yes, I have a copy.

4 Q. And is this the '241 patent that you
5 analyzed and formed opinions about in your
6 declaration submitted in this matter?

7 A. Yes, it is.

8 Q. And you had read the patent before being
9 retained by Sonrai for this matter, correct?

10 A. That's correct.

11 Q. You had reviewed it in the prior Sonrai
12 matter that we discussed earlier today; is that
13 correct?

14 A. That's right.

15 Q. Do you believe sitting here today that
16 you understand the claims at the end of the '241
17 patent marked as Exhibit Micron 1001?

18 A. Yes, I do, to the extent I talk about
19 them in my declaration.

20 Q. Does that mean that outside of what you
21 talked about in your declaration you do not have an
22 understanding of the claims?

1 A. I would just say to the extent there's a
2 claim I don't discuss or address, maybe I haven't
3 thought about it in as much depth, but certainly the
4 claims I'm talking about here today.

5 Q. Is there anything you don't understand
6 about the claims at the end of the '241 patent
7 marked as Exhibit Micron 1001?

8 MR. PETRSORIC: Objection to form.

9 A. Not that I recall, no.

10 BY MR. RIFFE:

11 Q. Before you were engaged by Sonrai for
12 this IPR proceeding or the prior IPR proceeding
13 related to the '241 patent, did you have any
14 relationship to any of the three named inventors of
15 the '241 patent?

16 A. No, I didn't.

17 Q. And had you -- have you done any work for
18 Atmel Corporation, which was the original assignee
19 of the '241 patent?

20 A. I have worked on matters that involved
21 Atmel. I don't recall if it was them specifically
22 or a company that had acquired them or their

1 technology. That should be listed on my CV, though.

2 Q. Do you recall what that work consisted of
3 for Atmel or the company that acquired them or their
4 technology?

5 A. I don't -- I don't recall specifically.

6 Q. Do you recall if it had to do -- if it
7 related to memory technology in general?

8 A. It may have. It should be on my CV, but
9 I don't recall specifically.

10 Q. And just for the record, do you own any
11 stock in Nera or Sonrai?

12 A. No.

13 Q. And does your compensation in this IPR
14 proceeding or the district court proceeding between
15 Sonrai and Micron depend upon the outcome of the
16 cases?

17 A. No, it does not.

18 Q. How much are you billing -- what's your
19 hourly billing rate that you're charging for your
20 work in this IPR proceeding?

21 A. If I recall correctly, it's \$700 per
22 hour.

1 Q. And is that a rate that changes depending
2 upon the type of work you're doing, for example,
3 whether you're doing a deposition or whether you're
4 traveling?

5 A. No, it should be the same rate for all
6 work.

7 Q. Do you charge for travel?

8 A. I believe I am in this matter, yes.

9 Q. And that's whether you're working on the
10 case or not, is that correct, you charge for that
11 travel time?

12 A. I think that's the -- I think that's the
13 case in this matter.

14 Q. Set the patent aside. We'll come back to
15 that in a minute.

16 If you will, please refer to your
17 declaration that was marked as Exhibit 2013 in this
18 IPR proceeding. Do you have that in front of you?

19 A. Yes.

20 Q. Do you recall how much time you spent
21 preparing this declaration?

22 A. No. It should be listed in the line

1 items of the invoice, though.

2 Q. Do you recall an approximate range of how
3 long it took you to prepare this declaration?

4 MR. PETRSORIC: Objection to form.

5 A. I don't. I mean, in some ways I would
6 say it involved most of my work on the matter in
7 terms of reviewing materials and forming opinions
8 that are discussed in here; but in terms of time
9 spent, you know, typing and assembling the document,
10 I don't recall.

11 BY MR. RIFFE:

12 Q. Do you recall if it was less than 50
13 hours?

14 A. I don't know. I'd have to go back and
15 look for you on that.

16 Q. Can you describe in general how you
17 prepared the declaration?

18 A. Sure. So if -- it's a fairly standard
19 process of putting together a first draft with a
20 table of contents and sections and things like that.
21 And populating that with cites and things of that
22 nature. And then an iterative process, editing and

1 refining, to ultimately the final version that gets
2 submitted.

3 Q. Did counsel for Sonrai participate in the
4 drafting of your declaration in any way?

5 A. Not in the opinions in the declaration.
6 There may have been some assistance with, like, some
7 of the legal definitions included, cleaning up
8 citations and formatting, things like that.

9 Q. Is it fair to say that each of the
10 opinions were your original opinions or were some of
11 the opinions set forth in your declaration provided
12 to you first by Sonrai's counsel?

13 A. No, these are all my own opinions.

14 Q. Do you recall who you worked with with
15 respect to Sonrai's counsel in preparing your
16 declaration?

17 A. If I remember right with regard to the
18 '241, it would have I think just been Mr. Petrsoric.
19 There may have been someone else on a call along the
20 way maybe attending a Zoom meeting or something, but
21 I think it was just Mr. Petrsoric.

22 Q. Have any of your opinions changed since

1 you submitted your declaration in this case?

2 A. No.

3 Q. If you'd turn to page 1, which — and
4 paragraph 5 specifically. Here you note: In
5 preparing the declaration, I've reviewed and
6 considered the '241 patent, the '241 patent's
7 prosecution history, the petition, Dr. James
8 Dickens' declaration, Exhibit 1003, submitted in
9 this proceeding, and each document cited in my
10 declaration.

11 Do you see that?

12 A. Yes, I do.

13 Q. Did you review or consider anything else
14 in preparing your declaration that's not cited in
15 paragraph 5 of your declaration?

16 A. No, not that I recall. Paragraph 5
17 should at least mirror the references in my table of
18 contents.

19 Q. And is it fair to say, then, that for
20 paragraph 5 that you did not review a draft of the
21 patent owner response in preparing your declaration;
22 is that correct?

1 A. That sounds right. I don't recall -- I
2 don't think I was reviewing a draft of that along
3 the way.

4 Q. Is that your normal practice, not to
5 review the patent owner response when you're
6 submitting a declaration in support of the patent
7 owner response in an IPR proceeding?

8 A. I would say if memory serves me
9 correctly, there have been cases where someone may
10 have sent me a draft of that kind of document, to
11 the extent it was referencing statements I was
12 making in my declaration, things like that.

13 Q. Is your declaration marked as
14 Exhibit 2013 in this matter accurate? In other
15 words, it doesn't have any mistakes as far as you
16 know, sitting here today?

17 A. Not that I'm aware of, no.

18 Q. Do you have any present plans sitting
19 here today to correct or supplement your declaration
20 marked as Exhibit 2013?

21 A. Not at this time, no.

22 Q. Let's turn to paragraph 29 of

1 Exhibit 2013. And here it says: Dr. Dickens states
2 that a person of ordinary skill in the art relating
3 to the technology of the '241 patent would have had
4 a bachelor's degree in electrical engineering or a
5 related field, and two to three years of experience
6 in the design or development of electronic circuits
7 or systems, or the equivalent. Additional graduate
8 education can substitute for professional
9 experience, or significant experience in the field
10 can substitute for formal education.

11 And then you go on to say: For purposes
12 of this declaration, I adopt Dr. Dickens' proposed
13 level of skill in the art.

14 Do you still agree with Dr. Dickens'
15 level of skill in the art as applied in your
16 declaration?

17 A. I don't recall saying that I disagree or
18 agree with it, just that this is the definition he
19 had offered that I was applying in this -- or asked
20 to apply in this declaration.

21 Q. Sitting here today, do you have any
22 issues with respect to Dr. Dickens' level of skill

1 in the art as set forth in your paragraph 29 of your
2 declaration marked Exhibit 2013?

3 A. I haven't formed an opinion as to whether
4 or not I would change it or not. I just used that
5 for the purposes of this declaration.

6 Q. So is it fair to say, then, for the
7 board's purposes that you agree with Dr. Dickens'
8 proposed level of ordinary skill in the art set
9 forth in paragraph 29?

10 A. I guess I would say for the purposes of
11 this declaration and the opinions that I'm talking
12 about, sure. I haven't explicitly offered an
13 alternative definition in this declaration.

14 Q. Is it your understanding that the claims
15 are construed from the perspective of a hypothetical
16 person of ordinary skill in the art at the time of
17 the claimed invention?

18 A. That's generally what I discuss in my
19 declaration, yes.

20 Q. And in your expert declaration, what date
21 did you use as the date of the claimed invention of
22 the '241 patent?

1 A. So I'm looking in the claim construction
2 section and I don't see that I inserted a date here.
3 I think that would have been, going back to the '241
4 patent, the filing date of January 27 of 2003.

5 Q. You see that on the '241 patent which is
6 Micron 1001 in the proceeding, you see there's
7 foreign application priority date of October 25th,
8 2002, listed on the face of the '241 patent?

9 A. I do see that, yes.

10 Q. Does that help refresh your recollection
11 as to what priority date you used for the '241
12 patent in your analysis that's set forth in your
13 declaration?

14 A. Right. That sounds like this foreign
15 application with the slightly earlier date of that
16 October 25 of '02.

17 Q. And so do you recall which date you used
18 as far as the priority date from which the claim
19 should be construed as from the viewpoint of a
20 person of skill in the art, whether that's the
21 January 27th, 2003, date or the foreign priority
22 date of October 25th, 2002?

1 A. So it sounds like it may have been that
2 2002 date. And I think Dr. Dickens may have
3 mentioned that in his declaration as well. If I was
4 disagreeing with that, I would have mentioned so in
5 my declaration.

6 Q. But sitting here today, do you recall
7 specifically which date you used in forming your
8 opinions that are set forth in your declaration
9 marked Exhibit 2013?

10 A. I think it would have been this 2002
11 date.

12 Q. And did you do any analysis as part of
13 your work in this matter to determine whether the
14 '241 patent is actually entitled to the foreign
15 application priority date of October 25th, 2002?

16 A. I don't recall discussing that in my
17 declaration, no.

18 Q. So sitting here today, do you have an
19 opinion as to whether the claims of the '241 patent
20 are supported by the earlier foreign application
21 priority date of October 25th, 2002?

22 A. I don't think I was asked to perform that

1 exercise. And I don't address that in my
2 declaration, that I recall.

3 Q. Is that something you normally do as part
4 of your work as an expert in an IPR matter to
5 determine whether or not the claims are supported by
6 a priority date claim?

7 MR. PETRSORIC: Objection, form.

8 A. It's something that I have been asked to
9 do in the past, if I remember right. I don't recall
10 specifics on it, though.

11 BY MR. RIFFE:

12 Q. Sitting here today, do you think it's a
13 necessary part of your expert work to determine
14 whether or not the claims are supported by a
15 priority claim date?

16 MR. PETRSORIC: Objection to form.

17 A. I guess it would depend on the context or
18 what tasks I was -- or what topics I was being asked
19 to address.

20 BY MR. RIFFE:

21 Q. Do you -- do you include the priority
22 date as part of your expert declaration when you

1 submit an expert declaration in an IPR proceeding,
2 for example?

3 MR. PETRSORIC: Objection to form.

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

6 BY MR. RIFFE:

7 Q. Generally -- so you agree with me that
8 there is no priority date analysis in your
9 declaration marked Exhibit 2013 in this matter,
10 correct?

11 A. I don't recall a specific -- or
12 explicitly having a section on that, no.

13 Q. And just in general in your work as an
14 expert and submitting expert declarations in IPR
15 proceedings, do you include either a priority date
16 analysis or at least identify what you believe is
17 the priority date to support your expert
18 declarations?

19 MR. PETRSORIC: Objection to form.

20 A. I would say I don't -- I don't think I've
21 always necessarily included a priority date
22 analysis. I think there have been some cases where

1 I was asked to do so.

2 BY MR. RIFFE:

3 Q. Let's turn back to the patent, which is
4 Exhibit Micron 1001 in the proceeding. And would
5 you agree with me that the '241 patent describes a
6 specific kind of charge pump, correct?

7 A. Yes. It talks about a design for a
8 charge pump with various characteristics to it.

9 Q. And is it fair to say that it describes a
10 three-component or three-part pump that has a
11 pumping circuit, loads and a load selector means?

12 A. So, yes, there's a pumping circuit and
13 the load selector means and various loads. And we
14 can see here, for example, on the first page there's
15 a load A, a load B and a load C with their various
16 associated switches.

17 Q. There's also a load S shown in that
18 figure with an associated switch; is that correct?

19 A. That's correct.

20 Q. And so each of these loads, S, A, B, C,
21 those are the loads that can be coupled to the
22 output of the pumping circuit; is that right?

1 A. These are loads, yes, that the patent
2 talks about coupling to this -- in this figure, this
3 V outline, not the overall circuit.

4 Q. And the '241 patent describes how the
5 pumping circuit can generate one of a plurality of
6 voltages, correct?

7 A. Yes. The pump is talking about
8 generating one of a set of these output voltages.

9 Q. For example, if you look at claim 1 as an
10 example, it says: A pumping circuit comprising one
11 or more stages operable to receive a supply voltage
12 and generate a selected one of a plurality of pump
13 voltages, correct?

14 A. That's correct.

15 Q. Now, the idea of a pumping circuit that
16 could be configured to output one of a plurality of
17 output voltages from a charge pump, that was known
18 before the '241 patent, correct?

19 A. I would say that there were -- the notion
20 of charge pumps were known or used in circuit design
21 prior to this patent.

22 Q. And the charge pumps that were known or

1 used in circuit designs prior to this patent, to
2 your knowledge, those could be configured to output
3 one of a plurality of output voltages, correct?

4 MR. PETRSORIC: Objection to form.

5 A. I would say I think even some of the
6 prior art references we'll talk about today have a
7 way of generating a different voltage level for
8 their respective circuits.

9 BY MR. RIFFE:

10 Q. Do you recall which of those specific
11 prior art references you're discussing?

12 A. I'd go back -- have to go back through
13 them, but I believe there were various references
14 talking about the use of diodes to generate a 5-volt
15 or a 10-volt or 20-volt-type level.

16 Q. So if you refer to column 1 of the
17 patent -- '241 patent, for example, at lines 55 to
18 60, here it's talking about the background art or
19 prior art pumps, isn't that correct, with respect to
20 Figure 1?

21 A. That's correct. It's generally talking
22 about some background of the technology.

1 Q. And the sentence starting at line 58 of
2 the '241 patent in column 1, it says: For example,
3 the charge pump, and it's referring to the charge
4 pump shown in Figure 1, may be called upon to supply
5 any of several different output voltages (V_{sub}
6 pump) only one of which is near the maximum.

7 Do you see that?

8 A. I see that sentence, yes.

9 Q. So you agree with me that even the '241
10 patent recognizes that charge pumps like Figure 1
11 prior art charge pump were able to supply several
12 different output voltages, correct?

13 A. I think this is -- generally what this is
14 talking about, you would have a pump to give a
15 different -- different output voltages.

16 Q. The patent also says that loads can be
17 capacitors or current sinkers, correct?

18 A. I'd have to go back to where in the
19 patent it states that.

20 Q. Okay. How about we go to column 4 around
21 lines 33 to 36.

22 A. Just taking a second to look.

1 Q. Sure.

2 (Witness reviews document.)

3 A. I see. It states: The charge pump
4 circuit of the present invention also includes
5 several different loads. Loads can be capacitors or
6 current sinkers.

7 BY MR. RIFFE:

8 Q. Now, loads can also be resistors,
9 correct?

10 MR. PETRSORIC: Objection to form.

11 A. I think that may be something that
12 Dr. Dickens was talking about in his declaration. I
13 don't see resistors -- the word "resistor" used in
14 these sentences in this specification here.

15 BY MR. RIFFE:

16 Q. Based on your experience, a resistor is a
17 type of load, though, correct?

18 A. Yes. You can put a resistor in a circuit
19 as a load and so forth.

20 Q. Do you agree in general that a load is
21 any electrical component in a circuit that consumes
22 electrical energy and converts it into another form,

1 such as heat, light or motion?

2 A. I don't know that I discuss that
3 definition in my declaration.

4 Q. Do you have a definition of load that you
5 applied in your analysis in this IPR proceeding?

6 A. I'm going back to my declaration. So it
7 looks like, as I recall, Dr. Dickens had two
8 different definitions for load that I discuss in my
9 paragraph 30. I haven't formed an opinion
10 necessarily agreeing with his definitions, but those
11 are the ones I use in this declaration.

12 Q. You mention in paragraph 30 in that last
13 sentence, you say: Although I do not necessarily
14 agree with either construction, I will respond to
15 Dr. Dickens' opinions based on his proposed
16 constructions as appropriate.

17 Why did you make the statement that you
18 do not necessarily agree with either construction in
19 paragraph 30?

20 A. That I noted in -- there are -- there
21 wasn't a construction offered in the district case
22 matter. And Dr. Dickens' two definitions seemed to

1 have different flavors to them when I looked at
2 them. I didn't go -- necessarily go through the
3 exercise of do I agree or disagree with them or want
4 to offer another definition. Perhaps I wasn't asked
5 to perform that task. And so I drafted my
6 declaration using the definitions that Dr. Dickens
7 had provided for this IPR.

8 Q. Is it fair to say in paragraph 30 that
9 you could have said: Although I do not necessarily
10 agree or disagree with either construction, I will
11 respond to Dr. Dickens' opinions based on his
12 proposed constructions as appropriate?

13 A. I guess all I'm saying here is I don't
14 necessarily agree with them, but I didn't use the
15 disagree language if that's what you're asking.

16 Q. Yeah. I'm just wondering, sitting here
17 today, do you have a position as to whether or not
18 those two alternative definitions Dr. Dickens
19 provided for the term "load" are incorrect?

20 A. I don't think I have formed that concrete
21 of an opinion or -- I think if I had, I would have
22 addressed that in this section.

1 Q. So it's fair to say, then, that you don't
2 have an opinion as to whether or not those proposed
3 definitions of load that Dr. Dickens provided are
4 correct or incorrect; is that right?

5 A. I would say -- I don't necessarily agree
6 with them, but I haven't -- I just simply adopted
7 them and that was the lens from which I drafted my
8 declaration. I didn't analyze them any -- beyond
9 that.

10 Q. Okay. So the patent talks about
11 capacitors or current sinkers being loads. We just
12 discussed that resistors can be a load. And
13 resistors and capacitors, you would agree, were
14 known before the '241 patent, correct?

15 A. Correct, yes. As circuit components,
16 yes.

17 Q. And those were -- resistors and
18 capacitors were known as possible loads in circuits,
19 correct, before the '241 patent?

20 A. I would say generally, yes, if someone
21 was looking at an undergrad book or something like
22 that, there could be examples of capacitive or

1 resistive components of a load, that kind of thing.

2 Q. Sitting here today, can you think of any
3 other examples of loads other than capacitors,
4 current sinkers or the resistors we've discussed?

5 A. I don't think I talk about them in my
6 declaration. There might be other circuit designs
7 out there that use things like inductors or
8 something that may refer to them as something like
9 that. I don't recall specifically.

10 Q. Any other circuit components other than
11 inductors that you would consider loads for circuit
12 purposes?

13 A. Not that I've talked about in my
14 declaration, no.

15 Q. Outside of your declaration, are you
16 aware of any others?

17 A. Not offhand, no.

18 Q. Now, the '241 patent also talks about
19 coupling a load to the output of a pumping circuit
20 used the load selector means, right?

21 (Witness reviews document.)

22 A. So the patent generally talks about that.

1 For instance, in column 4, roughly around line 48,
2 it mentions the switches and their respective
3 control signals forming that load selector means
4 that goes about achieving that reduction in voltage
5 ripple.

6 BY MR. RIFFE:

7 Q. And so just to make sure the record's
8 clear, I might have misspoke. The '241 patent talks
9 about coupling a load to the output of a pumping
10 circuit using the load selector means, correct?

11 A. I'm just trying to find here where it
12 uses that specific phrase. Maybe you can point me
13 in the specification.

14 Q. Sure. If you look, for example, at the
15 claims, column 8, claim 1. It says in part C of
16 claim 1: A load selector means for selectively
17 coupling a load associated with a specific pump
18 voltage to the output of said pumping circuit.

19 Do you see that?

20 A. Yes, I do.

21 Q. So does that help refresh your
22 recollection as to whether or not the patent — '241

1 patent talks about coupling a load to the output of
2 the pumping circuit using the load selector means?

3 A. That's right. It's talking about this
4 selectively coupling of the load using that load
5 selector means in this claim element C.

6 Q. And you understand that that load
7 selector means phrase is a -- has been construed as
8 a means plus function term for purposes of this
9 proceeding, correct, by both you and Dr. Dickens, I
10 believe?

11 A. I'm going back to paragraph 31 of my
12 declaration.

13 (Witness reviews document.)

14 A. So it looks like I'm stating in this
15 paragraph the opinions in my declaration.

16 BY MR. RIFFE:

17 Q. And which paragraph, sir?

18 A. Sorry. I'm in paragraph 31 of my
19 declaration on page 10.

20 Q. Okay.

21 A. The opinions in my declaration are the
22 same whether it's sort of the plain meaning or the

1 Dr. Dickens proposed construction of the function.

2 Q. So sitting here today, do you have a
3 position or an opinion as to whether the load
4 selector means is a means plus function term that
5 should be construed as such or do you have no
6 opinion at all with respect to the claim
7 construction of that phrase?

8 A. I don't believe I've offered an opinion
9 on the construction of that phrase.

10 Q. If it is construed as a means plus
11 function term, do you agree that there is a
12 corresponding structure and function described in
13 the '241 patent for the load selector means?

14 A. I'm just revisiting paragraphs 32 and 33.

15 Q. Sure.

16 (Witness reviews document.)

17 A. It looks like what I'm saying in these
18 two paragraphs is, yes, there's disclosure of this
19 structure, various switches, transistors, et cetera.

20 BY MR. RIFFE:

21 Q. And you would agree, then, that the
22 function of the load selector means is selectively

1 coupling a load associated with a specific pump
2 voltage to the output of the pumping circuit,
3 correct, as delineated, for example, in claim 1 of
4 the '241 patent?

5 A. That it's the -- as we were talking about
6 earlier, that, that selectively coupling of the load
7 with a specific pump voltage to that output of the
8 pumping circuit.

9 Q. Can you turn to Figure 3 of the '241
10 patent?

11 A. Okay.

12 Q. One of the corresponding structures
13 discussed in the '241 patent identifies as
14 corresponding to the load selector means is the set
15 of switches 320, 324 and 328 that are shown on
16 Figure 3, correct?

17 A. Yeah, these are -- I'm roughly at the top
18 of column 4, that there's the different loads, 322,
19 326 and 330, each connectable via respective switch,
20 320, 324 and 328, that we see here in Figure 3.

21 Q. Okay. And if we reference Figure 5A and
22 5B of the '241 patent, another one of the

1 corresponding structures that the '241 patent
2 identifies as corresponding to load selector means
3 is the set of switches and transistors seen here in
4 Figures 5A and 5B, correct?

5 A. That -- I'm in column 5, roughly starting
6 at 23, discusses Figure 5A and the EN_A switch 320.
7 And then referring to Figure 5B starting around line
8 33 of the same column talks about the switch
9 EN_A 320 and the load -- the load associated with it
10 in an elevator circuit.

11 Q. Okay. Referencing back to 5A where you
12 were reading in column 5 around line 23 -- or 22, I
13 guess I should say, it says: In reference to
14 Figure 5A one embodiment of the EN_A switch 320 and
15 the load 322 -- load A322 are shown. It says: The
16 switches 324 and 328 are similarly constructed. In
17 this embodiment the switch EN_A is an NMOS
18 transistor whose gate is connected to the EN_A
19 terminal, is that correct?

20 A. Yes.

21 Q. And so what that is saying is then that
22 the -- is the switches and transistors seen here in

1 Figures 5A and 5B are part of the corresponding
2 structures for the load selector means; is that
3 correct?

4 A. That it's describing one way that these
5 switches can be designed as part of that -- as part
6 of the load selection process in this case if you
7 were selecting the load A.

8 Q. And referring to paragraph 66 of your
9 declaration, which is Exhibit 2013 in the IPR, at
10 the bottom of the page 31, again, paragraph 66,
11 three lines up, that sentence says -- you say: The
12 specification of the '241 patent describes that the
13 switches 320, 323 and 328 and the transistors of
14 Figures 5A and 5B that may be used as switches are
15 each operated exclusively.

16 Do you see that?

17 (Witness reviews document.)

18 A. Took me going all the way through the
19 paragraph to find your sentence. That's right, it
20 says the -- I'm saying that the specification talks
21 about those switches 320, 323 and 328 are being used
22 to -- or are each operated exclusively here.

1 BY MR. RIFFE:

2 Q. And you also recognize the transistors of
3 Figures 5A and 5B that may be used as switches,
4 correct, in that sentence?

5 A. That's correct, yes.

6 Q. In that sentence you mention switches
7 320, 323 and 328. But if we look at Figure 3 of the
8 '241 patent, for example, is there a switch 323 in
9 Figure 3?

10 A. I don't see that there is. The 323 in my
11 paragraph 66 I think may have been off by one number
12 and should be referring to the switch 324 of
13 Figure 3A — I'm sorry, Figure 3.

14 Q. Okay. And that appears to be consistent
15 with that change to your earlier statement in
16 paragraph 66. About middle of the page it says: A
17 plurality of switches (320, 324, and 328) as shown
18 in Figure 3; is that right?

19 A. That looks right, yes.

20 Q. So just for the record, the description
21 of the switches in the second line from the bottom
22 on page 31 of your declaration, paragraph 66, should

1 say that the switches 320, 324 and 328, correct?

2 A. That looks right, yes.

3 Q. Okay. Thank you. So based on your
4 statement in paragraph 66 and the description of the
5 '241 patent we just reviewed, you would agree that
6 the '241 patent treats switches and transistors as
7 equivalent, correct?

8 A. In the sense that in some instances, for
9 example, in Figure 3 I think it uses the language of
10 switches for those elements 320, 324 and 328 we just
11 talked about. And then I think even as I say here
12 in Figure 5A and 5B, it seems to be using the
13 language of transistors.

14 Q. And with respect to paragraph 66 of your
15 declaration, you're saying that the '241 patent --
16 again, I'm referring to that last sentence at the
17 bottom. The '241 patent describes that the switches
18 320, 324 and 328 and the transistors of Figures 5A
19 and 5B that may be used as switches, you're equating
20 those, the switches and transistors, as does the
21 '241 patent, correct?

22 A. I would say that the '241 patent seems to

1 use that language perhaps interchangeably depending
2 on the figure it's referring to in certain contexts.

3 Q. Do transistors all work in the same way,
4 in your opinion?

5 MR. PETRSORIC: Objection to form.

6 A. You'd have to be more specific.

7 BY MR. RIFFE:

8 Q. So in other words, if you turn a
9 transistor on, current will flow through the
10 transistor, correct?

11 A. As a concept, yes. How much -- other
12 operating characteristics vary, but, yes, you can
13 turn it on and current can flow.

14 Q. Do you agree that you can turn a
15 transistor on to allow current to flow from one
16 circuit component to another, for example?

17 A. I guess if you were drawing a circuit
18 component at the whiteboard A and another component
19 B and there was a path between them that had a
20 transistor turned on, there would be some flow of
21 current in that sort of tutorial example.

22 Q. And another way of putting that is that

1 current would flow from one side of the transistor
2 to the other side of the transistor; is that right?

3 MR. PETRSORIC: Objection, form.

4 A. I would say sort of at the textbook
5 illustrative example, it would be shown coming in
6 one side, going out the other.

7 BY MR. RIFFE:

8 Q. You would agree that transistors were
9 known in the art before the filing date of the '241
10 patent, correct?

11 A. Yes. There are various types, yes.

12 Q. And using transistors as switches like as
13 described in the '241 patent, that was a known
14 concept as well, correct, before the filing date of
15 the '241 patent?

16 A. I would phrase it that the notion of
17 using a transistor as a switch was known in digital
18 circuits, computing, things like that.

19 Q. And using transistors to couple circuit
20 components together, that was also known before the
21 filing date of the '241 patent, correct?

22 A. I would say sort of taken in the abstract

1 or, again, as a whiteboard example, you could have a
2 path of current flow between two blocks if you put a
3 switch between them and turned the switch on.

4 Q. And that switch you're referring to would
5 be a transistor, for example, correct?

6 A. You could do it with a transistor as a
7 switch in that example.

8 Q. Okay.

9 MR. RIFFE: You guys want to take a
10 short break?

11 MR. PETERSORIC: Perfect.

12 (Recess taken from 10:18 a.m. to
13 10:40 a.m.)

14 BY MR. RIFFE:

15 Q. Dr. Brogioli, welcome back. Did you have
16 any discussions with your counsel during the break
17 about the substance of your testimony?

18 A. No.

19 Q. Referring back to paragraph 66 and 67 of
20 your declaration, which is, again, Exhibit 2013, we
21 were looking at those, at least paragraph 66,
22 earlier. You state that the '241 patent requires

1 that the selection of a particular load is to the
2 exclusion of other loads.

3 Do you see that?

4 (Witness reviews document.)

5 A. That's generally what I talk about in
6 these two paragraphs. For example, at the very top
7 of page 32 only one of the switches or coupling one
8 of the loads at a time is happening here.

9 BY MR. RIFFE:

10 Q. And I guess specifically you say at the
11 bottom of -- starting at the bottom of page 31,
12 which is paragraph 66 of your declaration you say:
13 The specification of the '241 patent describes that
14 the switches 320, 324, 328 and the transistors of
15 Figures 5A and 5B that may be used as switches are
16 each operated exclusively.

17 And you go on to say: In other words,
18 only one switch at a time (to couple one load to the
19 output of the pumping circuit) may be active or
20 closed at a time; is that correct?

21 A. That's right, yes.

22 Q. Now, when you're referring to each of the

1 switches being active or closed at a time, you're
2 referring to operation of the switches, correct?
3 Not the specific structure of the switches; is that
4 right?

5 A. I think that sounds right in the sense
6 that one -- switch zero may be connected while
7 switch one and two are open, for example.

8 Q. Okay. So it wouldn't matter what the
9 structure of the switch is; in other words,
10 transistor, capacitor, resistor, et cetera. Your
11 contention is that it's the exclusive operation of
12 the switch that distinguishes the claims from the
13 prior art; is that correct?

14 A. Well, as we discussed earlier, the patent
15 talks about switches in various places. And at
16 least in this part of claim 1, for example, is
17 talking about the manner in which the switches
18 operate with regard to the various loads.

19 Q. And going on to paragraph 67, you say:
20 More specifically, the '241 patent recites only one
21 load can be selected at a time, for example, if
22 voltage VA is selected enable_A -- or EN_A causes

1 the first switch 320 to close, connecting the first
2 load to the output terminal of charge pump circuit
3 300. The remaining loads 326 and 330 are
4 disconnected from the output terminal because their
5 respective switches 324 and 328 are open.

6 Did I read that correctly?

7 A. Yes.

8 Q. And so you agree that a charge pump that
9 has a load used for multiple output voltages is not
10 within the scope of claim 1 of the '241 patent,
11 correct?

12 MR. PETRSORIC: Objection, form.

13 A. Can I hear your question once more?

14 BY MR. RIFFE:

15 Q. Sure. Would you agree with me that a
16 charge pump that has a load that's used for multiple
17 output voltages is not within the scope of claim 1
18 of the '241 patent?

19 MR. PETRSORIC: Same objection.

20 A. That I'm pointing to in claim 1, the
21 multiple loads for the multiple output voltages and
22 the -- the switches that are used in this manner of

1 only one switch at a time is what I'm talking about
2 in my declaration.

3 BY MR. RIFFE:

4 Q. Would you agree with me that a charge
5 pump that has a load that is associated with
6 multiple output voltages is not within the scope of
7 claim 1 of the '241 patent?

8 A. Maybe you can ask a more specific
9 question. I don't recall talking about --

10 Q. I'm just trying to get an understanding
11 of when you say that only one switch at a time may
12 be active or closed. So you're saying, then, that
13 in the context of claim 1, for example, of the '241
14 patent, each load is associated with a single pump
15 voltage, correct?

16 A. That sounds like what I'm discussing in
17 66 and 67 --

18 Q. Okay.

19 A. -- in contrast, for example, of some of
20 the prior art that operates in a different way.

21 Q. And prior art that operates where a load
22 can be associated with multiple output voltages, in

1 your opinion, would not be within the scope of claim
2 1 of the '241 patent, correct?

3 A. That sounds right in the context of some
4 of the prior art that I discuss.

5 Q. And would you agree that a pumping
6 circuit that has more than one load connected to the
7 output terminal of the pumping circuit is not within
8 the scope of claim 1 of the '241 patent?

9 A. That sounds right. For example, in I
10 think perhaps the Buti reference that has multiple
11 transistors connected to a blind being different
12 from what the patent's talking about, at a high
13 level.

14 Q. So if the pumping circuit -- and this may
15 be related to the Buti reference, but I don't want
16 to put words in your mouth. So if the pumping
17 circuit has two loads connected to the output
18 terminal of the pumping circuit, that charge pump is
19 also not within the scope of claim 1 of the '241
20 patent, in your opinion, correct?

21 A. So in the -- for instance, with Buti, if
22 I have two switches or halves in this bleeder

1 circuit, for example, that are both turned on at the
2 same time, is not what I'm talking about in the
3 context of claim 1.

4 Q. And in that example that you just
5 provided, if you have two switches that are both
6 turned on, and i.e., there are two loads associated
7 with those two switches, that is not within the
8 scope of claim 1, in your opinion, correct?

9 A. I don't recall saying that that was in
10 the scope of my analysis of claim 1. That sounds in
11 line with some of the prior art references that I
12 point to as different from, at least in part, what
13 claim 1 talks about.

14 Q. And the loads that the '241 patent is
15 talking about that are selectively coupled to the
16 output of a pumping circuit, so it goes on to say
17 each load associated with a specific pump voltage,
18 that specific pump voltage that each load is
19 associated with is the V out or the ultimate pumping
20 voltage of the charge pump circuit, correct?

21 A. That looks right. For example, in
22 Figure 7 on the far right, there's a V out that as I

1 recall denotes the ultimate output of this device,
2 output voltage.

3 Q. And, for example, if we look at column 4
4 of the '241 patent, this is talking about in the
5 context I believe of Figure 3 at around line 35, it
6 says: Each load is associated with a different pump
7 out put voltage V out.

8 Do you see that?

9 A. I do.

10 Q. And that is -- if we look at Figure 3,
11 the V out that it's talking about each load being
12 associated with, that is the ultimate pump output
13 voltage V out of the charge pump, correct?

14 A. In Figure 3 the V out is the ultimate
15 voltage that the device is generating for that
16 setting, for example.

17 Q. Okay. And as the '241 patent tells us,
18 for example, at column 4, line 35: Each load is
19 associated with a different pump output voltage
20 V out, correct?

21 A. That's what it says, yes.

22 Q. Then it goes on to say in column 4 around

1 line 36, it says: The number of loads provided to
2 the circuit may vary depending on the number of
3 target pump voltages that can be provided, correct?

4 A. Yes.

5 Q. What does that mean, in your opinion?

6 A. Give me a second to look at the
7 paragraph.

8 Q. Sure.

9 (Witness reviews document.)

10 A. So the sentence states: The number of
11 loads provided to the circuit may vary depending on
12 the number of target pump voltages that can be
13 provided.

14 I don't know that I address the sentence
15 in my declaration, but it may be talking about the
16 concept of varying the number of load blocks A, B,
17 C, D, E, for example, to support a varied number of
18 desired output voltages with respect to ripple
19 conditions, for example.

20 BY MR. RIFFE:

21 Q. Okay. So theoretically in the design
22 process, the charge pump as described here in

1 figure -- in column 4 would have a number of
2 different output voltages, V out, that it would be
3 capable of creating and then based on that number of
4 V out possibilities, you're saying that what's being
5 described here is that you would then have a
6 corresponding number of load blocks associated with
7 each of those V outs?

8 A. That -- for example, in Figure 3, we see
9 a load A, a load B, and a load C. So we'll call
10 that three. And there's the three corresponding
11 switches. If you wanted to have four, you might add
12 a load C with a corresponding EN_ -- I'm sorry, a
13 load D with a corresponding EN_D maybe as an
14 example.

15 Q. Okay. Thank you. Let's go to Figure 10
16 of the '241 patent, which is Exhibit MTI-1001. And
17 then its associated description in the
18 specification, which I believe starts around
19 column 7, line 10.

20 A. Okay.

21 Q. So Figure 10 describes a method for
22 achieving minimum voltage ripple of the charge pump

1 of the '241 patent, correct?

2 A. So this paragraph in column 7 starting
3 around 6 is talking about providing a method for
4 achieving minimal voltage ripple of the charge pump
5 and then goes on to describe this flow diagram of
6 Figure 10 roughly around line 10.

7 Q. And then starting around line 10 it says,
8 referring to Figure 10: The flow chart shows a
9 method 1000 usable especially with the circuits of
10 Figures 3 and 7 for achieving minimum voltage ripple
11 in charge pump circuit 600, correct?

12 A. Yes.

13 Q. Then it goes on to say: By dynamically
14 selecting the best load that yields the desired
15 result; is that correct?

16 A. Yes.

17 Q. What does it mean by selecting the best
18 load that yields the desired result? If as we just
19 discussed each load is associated with a specific
20 output voltage, what does it mean by selecting the
21 best load? Isn't the correspondence between the
22 load and the output voltage already set based in

1 your opinion?

2 MR. PETRSORIC: Objection to form.

3 (Witness reviews document.)

4 A. So it looks like this section is
5 referring to the flow diagram for Figure 10 and
6 talking about a case where, starting at line 13 of
7 column 7, it says: By dynamically selecting the
8 best load that yield the desired result including
9 the decision whether to set load S in addition to
10 one of the loads A, B or C.

11 And it shows in a flow diagram what looks
12 like the decision logic of this add load and it
13 seems to be the S that's being referred to.

14 BY MR. RIFFE:

15 Q. And S being referred to is, if we look
16 back at Figure 7, that's load S that is denoted as
17 element 718 in Figure 7; is that correct?

18 A. That looks to be load S, at least in
19 Figure 7, yes.

20 Q. So if we walk through this flow diagram,
21 then, it says at step 1007 -- and this is down
22 around line 41 in column 7. It says: The pumping

1 phase (step 1007) is enabled; is that right?

2 A. That's right.

3 Q. That means the pumping circuit is going
4 to start creating charge; is that right?

5 MR. PETRSORIC: Objection to form.

6 A. That the pumping portion of the circuit
7 will start enabling and, you know, generating
8 various voltages, for example.

9 BY MR. RIFFE:

10 Q. Okay. And then it goes on to say at step
11 1008, the charge pump circuit measures the pump
12 output voltage (V_{cfra}) against the reference voltage
13 (V_{ref}), correct?

14 A. Where are you reading from in 7?

15 Q. Starting at around line 43, step 1008.

16 A. Right. It mentions to -- in order to
17 ensure that the pump output is at the right output
18 voltage value, the charge pump circuit measures the
19 pump against the reference voltage.

20 Q. And it goes on to say if the pump output
21 voltage is less than V_{ref} , the circuit continues the
22 pumping of the charge pumping circuit, correct?

1 A. I think what it technically says is when
2 the measured pump output voltage Vcfra is greater
3 than the reference, there's an overshoot condition.

4 Q. Okay. Sorry.

5 A. The output's beyond that target voltage.

6 Q. And that's a little different question.
7 If you go further down in the paragraph around line
8 53 or 52, it says: If the pump output voltage is
9 less than Vref, the circuit continues the pumping of
10 the charge pump circuit, correct?

11 MR. PETRSORIC: Objection, form.

12 A. Yeah, generally it's saying when that
13 output voltage Vcrfa [sic] is less than the
14 reference, in other words, the output's lower than
15 the desired value, the circuit continues the -- that
16 enable pumping step.

17 BY MR. RIFFE:

18 Q. And earlier -- strike that.

19 If the pump output voltage Vcfra is
20 greater than the Vref, the logic circuit of the
21 charge pump circuit orders the charge pump circuit
22 to halt operations, correct?

1 MR. PETRSORIC: Objection to form.

2 A. Going back to line 47, when the Vcrfa is
3 greater than the reference voltage is the overshoot
4 condition and it orders the charge pump circuit 600
5 to halt operation, step 1009.

6 BY MR. RIFFE:

7 Q. Okay. And if the pump output voltage
8 Vcfra is greater than Vref, then it determines
9 there's voltage overshoot, and at step 1012 the
10 circuit adds a load so that voltage ripple can be
11 reduced, correct?

12 A. That looks like what it's saying at line
13 61 of column 7.

14 Q. It says: At step 1012 the circuit 600
15 adds a load so that voltage ripple can be reduced.
16 This step continues until the voltage ripple is
17 reduced and then the circuit 600 goes to the next
18 step, correct?

19 A. Correct.

20 Q. By saying that this step continues until
21 the voltage ripple is reduced, what that's talking
22 about is step 1012 of adding a load so that it can

1 be -- the voltage ripple can be reduced, correct?

2 A. That it's referring to that add load step
3 of block 1012 in order to handle the reducing of the
4 voltage ripple.

5 Q. And then the pump compares the output
6 voltage V_{cfr} with the reference voltage to see if
7 also there are voltage undershoots, right?

8 A. I think -- I'm just trying to keep track
9 of the notation. In block 1014 it talks about
10 checking if the output voltage here V_{cfr} to a
11 reference voltage to see if what it refers to as a
12 minimum drop of the output voltage occurs. And
13 there's a corresponding block also labeled 1014 that
14 says subtract a load.

15 Q. And at step 1016 the circuit 600 removes
16 a load so that voltage drop can be reduced. Then it
17 goes on to say this step continues until the voltage
18 drop is reduced and then the circuit moves to the
19 next step, correct? That was in column A.

20 A. Right. That -- you read that correctly
21 from line 5.

22 Q. So based on this diagram -- flow diagram

1 and the comparisons between the Vcfra and the Vref,
2 you agree that the '241 patent discloses adding and
3 subtracting loads from the output of the pumping
4 circuit, correct?

5 A. That -- this flow diagram we've been
6 talking about is discussing the load 718 or load S
7 internal to this Figure 7. And -- it's at least in
8 part described in column 6 at line 12 that the
9 second comparator 714 instructed the logic circuit
10 712 to add load S 718 whenever this maximum
11 acceptable ripple on the target output sampled in
12 node Vcfrb is greater than a reference voltage.

13 Q. So is load S associated with a specific
14 output voltage of the charge pump, which I think we
15 established is the V out?

16 A. That the V -- sorry. The various loads
17 A, B and C are associated with these target output
18 voltages that we were talking about earlier.

19 Q. Is VS associated with a specific output
20 voltage, V out?

21 MR. PETRSORIC: Objection, form.

22 A. I would say it looks like at least

1 Figure 10 is describing a way that the load S block
2 can be used in addressing certain tolerance with --
3 tolerances with regard to the voltage ripple.

4 BY MR. RIFFE:

5 Q. And you can -- load S can be additive or
6 load S can be subtractive based on the description
7 of the flow diagram of Figure 10, correct?

8 MR. PETRSORIC: Objection, form.

9 A. I would say that Figure 10 talks about
10 the notion of 1012 add load and 1014 subtract a
11 load.

12 BY MR. RIFFE:

13 Q. And you see in column 7 around line 10
14 that we looked at earlier, it says -- the '241
15 patent says: Referring to Figure 10, the flow chart
16 shows a method 1000 usable especially with the
17 circuits of Figures 3 and 7 for achieving minimum
18 voltage ripple in the charge pump circuit 600,
19 correct?

20 A. That's what it says, yes.

21 Q. And if we look at Figure 3 of the '241
22 patent as an example, that load S is not shown in

1 Figure 3's circuit diagram, correct?

2 A. Just going on the visual of circuit 3, I
3 don't see an explicit block labeled load S.

4 Q. Do you have an understanding of how
5 the -- how loads are added with respect to the
6 Figure 3 embodiment in relation to the description
7 of the flowchart Figure 10 that we just walked
8 through?

9 MR. PETRSORIC: Objection, form.

10 (Witness reviews document.)

11 A. So I guess I would go to my earlier
12 answer. I don't see that block load S in Figure 3
13 or labeled that way.

14 BY MR. RIFFE:

15 Q. So is there any -- any discussion in the
16 '241 patent, then, in view of the discussion in
17 Figure 10 and its method steps, the flowchart, if
18 you will, to prevent, for example, one of the loads
19 A, B or C, depending upon the configuration, to be
20 the added load that is discussed with respect to the
21 flowchart of Figure 10 in column 7?

22 A. I don't discuss in my declaration that

1 Figure 10 is talking about when it says, for
2 example, add a load, referring to block B or C in
3 Figure 3.

4 Q. So when Figure 10 and the flowchart
5 described in -- with respect to Figure 10 in column
6 7 discusses adding a load or subtracting a load
7 depending upon the value of V_{cfra} relative to V_{ref}
8 in conjunction with the Figure 3 circuit embodiment,
9 what loads could be added or subtracted in that
10 embodiment to be in compliance with the description
11 in column 7?

12 A. So Figure 10's talking about the
13 comparison of V_{cfrb} in reference to the reference
14 voltage and adding a load. I think you may have
15 said V_{cfra} . And it looks like the language of
16 column 7 is talking about the circuits of the type
17 in Figure 3 and Figure 7. And so it may just be the
18 case that such a load isn't -- the additive load
19 that's being discussed in Figure 10 isn't shown in
20 Figure 3. Or maybe Figure 3 doesn't use one, but it
21 is a similar flavor of circuit to Figure 7.

22 Q. Do you agree that based on the

1 description -- before I go there. When I said
2 Vcfra, that is compared to Vref, though, in terms of
3 determining whether there's an overshoot or not,
4 correct?

5 MR. PETRSORIC: Objection, form.

6 BY MR. RIFFE:

7 Q. It says: Whenever the measured pump
8 output voltage (Vcfra) is less than the reference
9 voltage, the output is lower than the desired value
10 and the circuit continues to enable the pumping of
11 the charge pump circuit.

12 I was reading around line 52 of column 7
13 of the '241 patent.

14 A. That's right. Whenever the measured pump
15 voltage (Vcfra) is less than the reference voltage,
16 dot, dot, dot, the circuit 600 continues to enable
17 the pumping of the charge pump circuit.

18 Q. But column 7 also talks about Vcfrb being
19 compared to Vref in order to determine whether
20 there's an overshoot as well, correct?

21 A. That's correct.

22 Q. So when you said earlier that it may just

1 be the case that the load -- the additive load
2 that's being discussed in Figure 10 isn't shown in
3 Figure 3 or maybe Figure 3 doesn't use one but is a
4 similar flavor of circuit to Figure 7, what are you
5 basing that on? Just your experience or something
6 in the '241 patent?

7 A. Well, this sounds like something that
8 I -- that is not something I addressed in my
9 declaration. I don't know if Dr. Dickens discussed
10 this or not, but the passage in column 7 refers to
11 usable especially with the circuits of Figure 3 and
12 Figure 7 for this minimum voltage ripple, or
13 achieving a minimum voltage ripple. In Figure 7 we
14 see a block S and in Figure 3 we don't see a block S
15 visualized.

16 Q. And so when that load S is added, for
17 example as described in column 7 of the '241 patent,
18 you would agree with me that there are two switches,
19 for example, 716 and 720 if load A had been
20 previously enabled. Those two switches are closed
21 at the same time when load S is added to the
22 circuit, correct?

1 (Witness reviews document.)

2 A. So I'm going back to column 5, roughly
3 line 54. And Figure 7 talks -- it says: Another
4 embodiment of the present invention is shown with
5 the selector means expanded to further compare the
6 maximum acceptable ripple on the pump voltage
7 output. And then goes on to describe that there is
8 in Figure 7's embodiment a set load switch 716 that
9 you were asking about and that's connected to a set
10 load 718 here as a separate component of this
11 circuit.

12 BY MR. RIFFE:

13 Q. Uh-huh. And what I'm saying is as
14 described with respect to the methodology of
15 Figure 10, which is applicable to embodiment of
16 Figure 7, when, for example, the enable A switch is
17 positive and it closes and it enables the load A to
18 be added to the circuit, when it goes through the
19 process of looking at overshooting/undershooting and
20 adding the load S to that circuit, load S being 718,
21 you would agree with me that when that load S is
22 added to the circuit, switch 716, which is

1 associated with load S, is also closed, correct?

2 MR. PETRSORIC: Objection to form.

3 A. That it sounds like it's describing that
4 to the extent load S is being used in the
5 description in column 7 --

6 BY MR. RIFFE:

7 Q. I don't think -- okay. Yes. Sorry about
8 that.

9 A. Do you want me to continue?

10 Q. Yes, please. Sorry.

11 A. It looks like it's describing in column 7
12 that the -- that there's this other load S that can
13 be used as described in the flow diagram at
14 Figure 10 to add or remove some load based on the
15 ripple and that load S has to be connected. It
16 looks like it's describing a set load switch would
17 be part of engaging that load.

18 Q. Okay. In that condition, then, you would
19 agree with me that -- that those switches then are
20 not operated exclusively or, as you said, in other
21 words only one switch at a time may be active or
22 closed at a time, correct?

1 A. That with respect to the target output
2 voltages, one of the switches on load A, load B and
3 load C are engaged. It sounds like if load S is
4 being used per the flow diagram in Figure 10 for an
5 adjustment related to the ripple present, that that
6 load S is connected at that time.

7 Q. So you agree with me, then, that based on
8 this description that we've discussed in the '241
9 patent, it discloses adding and subtracting loads
10 from the output of the pumping circuit, for example,
11 in the context of when it's adding load S as
12 described in column 7 of the '241, correct?

13 A. The column 7 in Figure 10 talked about
14 the adding or subtracting of the load with regard to
15 the output ripple and again in setting.

16 Q. Do you have a copy of the patent owner's
17 response in front of you? I don't think you do.

18 A. I don't think I do.

19 MR. RIFFE: I'll have this marked as
20 Exhibit 1 to the deposition since it does not have
21 an exhibit number.

22

1 (Deposition Exhibit 1 marked for
2 identification.)

3 BY MR. RIFFE:

4 Q. You've been handed what's marked as
5 Exhibit 1. Do you recognize this document?

6 A. This looks like the Sonrai or patent
7 owner's response in this proceeding.

8 Q. And as I asked you earlier, you
9 established earlier, you have not reviewed this
10 patent owner response before your deposition today;
11 is that correct?

12 A. Oh, it may have been sent to me perhaps
13 after it was filed or at some point along the way.
14 I don't -- I don't know that I reviewed it yesterday
15 or perhaps the day before in my preparation.

16 Q. Have you reviewed it at any point after
17 it was sent to you after it was filed or at some
18 point along the way?

19 A. Perhaps. Usually that's the case, but I
20 don't recall specifically.

21 Q. So sitting here today, you don't recall
22 reviewing the patent owner response in preparation

1 for your deposition today; is that correct?

2 A. I guess I would say I don't remember
3 looking at this document specifically in the last
4 day or two as part of my preparation.

5 Q. All right. If we turn to page 7 of the
6 patent owner response, Exhibit 1 to your deposition.
7 At the last sentence of that first full paragraph on
8 page 7, the patent owner states that claim 1 of the
9 '241 patent requires that the loads and consequently
10 the output voltage of a pumping circuit be
11 dynamically selectable.

12 Do you see that?

13 (Witness reviews document.)

14 A. I see that sentence at the top of page 8.

15 BY MR. RIFFE:

16 Q. I was looking -- I apologize. That might
17 be the same statement, but I was looking at page 7.

18 A. Okay.

19 Q. And the first full paragraph, the last
20 sentence, it says about the middle of the page:
21 Based on the totality of the claim, it requires that
22 the loads and consequently the output voltage of the

1 pumping circuit be dynamically selectable.

2 Do you see that?

3 A. I do, yes.

4 Q. Do you agree with that statement?

5 A. That sounds right, as to it talking about
6 there being a group of possible output voltages and
7 those output voltages being selectable.

8 Q. And when you say that there's a group of
9 possible output voltages and those output voltages
10 being selectable, what voltages specifically are you
11 referring to?

12 A. Well, for example, if there's a target
13 voltage associated with a load A and a load B and a
14 load C that we had talked about earlier today.

15 Q. And that target voltage associated with
16 load A, B or C, that's the V out of the charge pump,
17 correct, such as shown in, for example, Figure 3 of
18 the '241 patent and Figure 7 of the '241 patent?

19 A. There would be, for example, in Figure 3
20 loads associated with a specific V out.

21 Q. And would your statement be the same with
22 respect to the embodiment of Figure 7?

1 A. That's right. For a given desired V out
2 there is a selected -- for example, a load A
3 associated with that.

4 Q. Now, in page -- on page 7 of the patent
5 owner response, that statement we just read: Based
6 on the totality of the claim, it requires that the
7 loads and consequently the output voltage of the
8 pumping circuit be dynamically selectable.

9 So your understanding of what the phrase
10 "the output voltage of the pumping circuit" is, that
11 is the V out of the charge pump shown in Figures 3
12 and Figure 7, correct?

13 MR. PETRSORIC: Objection, form.

14 A. That this looks like it's talking about
15 for selecting -- for a desired pump voltage, having
16 a load associated with that pump voltage, what it's
17 referring to here on page 7.

18 BY MR. RIFFE:

19 Q. And as we just established, the desired
20 pump voltage that you're referring to is the V out
21 of the charge pump shown in Figures 3 and Figure 7,
22 correct?

1 MR. PETRSORIC: Objection, form.

2 A. Well, the load is associated with a
3 specific desired pump voltage. And then this
4 device, for example, in Figure 3 is going to be
5 producing some voltage out on that far-right line
6 that we see coming out of the figure.

7 BY MR. RIFFE:

8 Q. So I just want to be clear and make sure
9 that we have a clear record, that I have an
10 understanding. What is the pumping circuit
11 referenced here on page 7 in this sentence that
12 we've been discussing? What is the pumping circuit?
13 We'll specifically look at Figure 3. What's the
14 pumping circuit of Figure 3 that's being referenced
15 there?

16 MR. PETRSORIC: Objection, form.

17 A. It looks like what this paragraph may be
18 saying is that there's a pumping circuit in Figure 3
19 receiving a supply voltage that we see coming in on
20 the top.

21 BY MR. RIFFE:

22 Q. The VCC; is that correct?

1 A. Right. And the pumping circuit
2 generating a plurality of these voltages and then
3 there's also the plurality of load associated with a
4 specific pump voltage that we see in Figure 3. And
5 then the load selector here selectively couples a
6 load associated with a voltage to the output of the
7 pumping circuit, which is that V outline.

8 Q. So could you on your Figure 3 draw a box
9 around what you consider to be the pumping circuit
10 of -- that is denoted in Figure 3?

11 MR. PETRSORIC: Objection to form.

12 A. So it looks like the way claim 1 refers
13 to in the preamble -- so I'm in column 8, line 16, a
14 charge pump circuit for generating a charge pump
15 voltage and that circuit's comprised of a pumping
16 circuit with one or more stages to generate a
17 plurality of voltages and a plurality of loads that
18 you can couple to it and the load selector for
19 coupling the loads, that all comprise the overall
20 charge pump circuit.

21 BY MR. RIFFE:

22 Q. You just said a charge pump circuit

1 generating a charge pump voltage. That circuit is
2 comprised of a pumping circuit with one or more
3 stages to generate a plurality of voltages, correct?

4 A. A plurality of pump voltages, correct.

5 Q. What the claim actually says is generate
6 a selected one of a plurality of pump voltages,
7 correct?

8 A. Correct.

9 Q. But again, my question was, can you on
10 Figure 3 draw for me what you consider to be the
11 pumping circuit denoted in Figure 3?

12 A. I guess I haven't really broken that down
13 in my declaration. But I think someone looking just
14 at Figure 3 in isolation would realize that sort of
15 the left half of the figure is doing some form of
16 pumping here.

17 Q. So the left half of the figure would
18 include the diodes 304, 306 up to 308 as well as the
19 capacitors 310 and 312; is that correct?

20 A. For that portion of the circuit, yes.

21 Q. Is there a voltage that comes out of the
22 right-hand side of that diode marked 308 in

1 Figure 3?

2 A. I guess depending on what state the
3 circuit was in, there would presumably be some
4 reading on the output -- or that node within the
5 circuit.

6 Q. Isn't that the output voltage of the
7 pumping circuit that is referenced here in page 7 of
8 the patent owner response?

9 A. I don't know if that's what is being
10 referred to in this paragraph or not.

11 Q. If we look at column 3 of the '241 patent
12 around line 64, it says: With reference to
13 Figure 3, a charge pump circuit 300 comprises a
14 pumping circuit including one or more pump stages
15 operable to receive a supply voltage VCC and
16 generate one or more pump voltages.

17 Do you see that?

18 A. Yes.

19 Q. Does that help you understand what is
20 referenced by the pumping circuit on page 7 of the
21 patent owner response?

22 MR. PETRSORIC: Objection to form.

1 A. It looks like this section of the patent
2 is talking about the charge -- sorry, the pumping
3 circuit with one or more stages. And here we
4 show -- in this example at the top of column 4, an
5 example with two pump stages and then page 7 of the
6 patent owner response I guess mirroring the patent's
7 language is -- seems to be referring to that same --
8 those same pump stages, I would guess.

9 BY MR. RIFFE:

10 Q. I guess my ultimate question I'm trying
11 to get is, is the output voltage of the pumping
12 circuit that's referenced in the patent owner
13 response page 7, is that output voltage the same as
14 the V out that's shown in Figure 3 and Figure 7 of
15 the '241 patent?

16 MR. PETRSORIC: Objection to form.

17 A. Well, I guess I would say the V out in
18 Figure 3, if you were sampling voltages at different
19 points of Figure 3, will be different than, for
20 example, nodes to the left at the various loads if
21 one of the given loads is connected, because they're
22 changing the ultimate behavior of, versus what's

1 sort of just the pumping stage versus the ultimate
2 output.

3 BY MR. RIFFE:

4 Q. So if we look at what we just looked at
5 in conjunction with claim 1 of the '241 patent, for
6 example, '241 patent claim 1 says: A pumping
7 circuit comprising one or more stages operable to
8 receive a supply voltage and generate a selected one
9 of a plurality of pump voltages.

10 You would agree with me that what claim 1
11 is referring to here as the pumping circuit is
12 what's shown, for example, in Figure 3 as a
13 two-stage pumping circuit which generates one or
14 more pump voltages as described in the bottom of
15 column 3 of the '241 patent that we just reviewed,
16 correct?

17 MR. PETRSORIC: Objection, form.

18 A. That the language of claim 1 in element A
19 talks about a pumping circuit having one or more
20 stages to -- stages operable to receive a supply
21 voltage and generate a selected one of a plurality
22 of pump voltages. And that seems to align with the

1 language at the bottom of column 3 that's talking
2 about a pumping circuit with the one or more pump
3 stages.

4 BY MR. RIFFE:

5 Q. And the pump voltage that's created by
6 the pumping circuit, you would agree with me, is the
7 pump voltage that, if we refer to Figure 3, for
8 example, is coming out of the diode 308, correct?

9 A. I guess I would say it -- it would be the
10 output of those purge stages versus a different
11 voltage you would have, for example, measured at
12 V out when one of the loads is attached.

13 Q. Okay. And V out, if we look at the
14 patent claim again, is with respect to element B as
15 we discussed earlier, you have a plurality of loads
16 selectively coupleable to an output of the pumping
17 circuit, each load associated with a specific pump
18 voltage.

19 As we saw with respect to column 4, line
20 35, commensurate with claim 1, it says each load is
21 associated with a different pump voltage output
22 voltage, V out, correct?

1 A. Yes, that's what column 4 says in regard
2 to -- each of those loads associated with a
3 different pump output voltage.

4 Q. And so going back to the patent owner
5 response, page 7, you agree that -- with the patent
6 owner that the totality of the claim requires that
7 the loads be dynamically selected, correct?

8 A. The loads and the -- it says consequently
9 the output voltage.

10 Q. Okay. But I'm just asking just to make
11 the record clear. To practice claim 1 of the '241
12 patent, the loads of the charge pump have to be
13 dynamically selected during operation; is that
14 correct?

15 MR. PETERSORIC: Objection, form.

16 A. It says that the loads have to be
17 dynamically selectable.

18 BY MR. RIFFE:

19 Q. What does dynamically selectable mean if
20 it doesn't mean dynamically selected during
21 operation?

22 A. Well, for instance, when you turn a

1 device on, it could go read configuration
2 information to see, Do I want voltage A or B or C
3 and then pull that information from fuses or memory
4 or what have you and run the pump that way.

5 Q. But that's also during operation of the
6 pump, though, correct, when you turn it on, you're
7 operating the pump even if it's in a configuration
8 state?

9 A. I guess I would phrase it that if
10 you're -- I've got five different operating settings
11 stored in ROM or in fuses and I sort of figuratively
12 flip the on switch, the desired operation of the
13 device is going to be whichever of those settings I
14 decided or selected. There may be some transience
15 coming online, that kind of thing.

16 Q. In view of the patent owner response and
17 the established pump voltage versus V out voltage
18 that we just established, it's your opinion that to
19 practice claim 1 of the '241 patent the output
20 voltage of the pumping circuit has to be dynamically
21 selectable, correct?

22 A. That -- yes. And that seems to be what

1 the patent owner is talking about in this paragraph
2 on page 7.

3 Q. And just to be clear, what they're not
4 talking about is the output voltage of the charge
5 pump V out; is that correct?

6 MR. PETRSORIC: Objection, form.

7 A. I don't see that they're saying --
8 addressing that one way or the other in this
9 paragraph.

10 BY MR. RIFFE:

11 Q. They're referring to the output voltage
12 of the pumping circuit which we established earlier
13 is different than the V out, correct?

14 MR. PETRSORIC: Objection, form.

15 A. Well, it talks about in the beginning of
16 this paragraph claim 1 requiring a pumping circuit
17 to receive a supply voltage to generate a selected
18 one of a plurality of pump voltages.

19 BY MR. RIFFE:

20 Q. Right. And so when they come down and
21 they say the output voltage of that pumping circuit
22 has to be dynamically selectable, it's not referring

1 to the V out ultimately, which we established
2 earlier is different than the voltage coming out of
3 the pumping circuit, correct?

4 MR. PETRSORIC: Objection, form.

5 A. It looks like this sentence is saying
6 that the loads and the output voltage of the pumping
7 circuit are dynamically selectable.

8 BY MR. RIFFE:

9 Q. Right. And I'm just trying to be clear
10 here. The output voltage of the pumping circuit is
11 the voltage that is output from this two-stage
12 charge pump circuit in Figure 3 that can then be
13 modified by adding one of the loads A, B, C to
14 ultimately obtain the V out, correct?

15 MR. PETRSORIC: Objection, form.

16 A. That there's the pumping circuit stage
17 that's generating a pump voltage and there's the
18 selectable loads that can be attached and then that
19 results in a V out on the right-most side.

20 BY MR. RIFFE:

21 Q. And that V out on the right-most side is
22 not the output voltage of the pumping circuit that's

1 referenced in the patent owner response on page 7,
2 correct?

3 MR. PETRSORIC: Objection, form.

4 A. Well, it seems to me that they're all
5 being mentioned in this paragraph, that there's a
6 plurality of loads, each associated with a specific
7 pump voltage, a load selector that is selectively
8 coupling a load associated with a specific pump
9 voltage, and then stating that based on the totality
10 of the claim, it requires that the loads and
11 consequently the output voltage of the pumping
12 circuit be dynamically selectable.

13 BY MR. RIFFE:

14 Q. And again, as we established earlier, the
15 specific pump voltage that the loads are associated
16 with, that is V out, correct, in accordance with the
17 '241 patent, Figures 3 and 7 as examples?

18 A. That if there's a desired V out from, for
19 example, Figure 3, there would be a load associated
20 with achieving that desired V out.

21 Q. Okay. And that specific pump voltage
22 that's coupled to the loads -- or strike that.

1 The loads that are associated with that
2 specific pump voltage, i.e., V out, that V out is
3 not the output voltage of the pumping circuit that
4 must be dynamically selectable as referenced in
5 paragraph -- at the end of the paragraph on page 7;
6 is that correct?

7 MR. PETRSORIC: Objection, form.

8 A. Well, that the last sentence of paragraph
9 7 seems to say that when considering the claim as a
10 whole, that the loads and consequently the output of
11 voltage of the pumping circuit are dynamically
12 selectable.

13 BY MR. RIFFE:

14 Q. And all I'm trying to get at is, to be
15 very specific, the output voltage of the pumping
16 circuit the patent owner was saying must be
17 dynamically selectable, that is the output voltage
18 coming from the pumping circuit which, as an
19 example, is the two-stage pumping circuit shown in
20 Figure 3, correct?

21 MR. PETRSORIC: Objection, form.

22 A. It looks like they're saying that the

1 pumping circuit generates a selected one of a
2 plurality of pump voltages as referred to in claim 1
3 at 18 to 20, and there's a plurality of loads each
4 associated with a specific pump voltage. And then
5 the load selector means.

6 BY MR. RIFFE:

7 Q. Maybe I'll try this. You agree with me
8 at least that the specific pump voltage referenced
9 in this paragraph is different than the output
10 voltage of the pumping circuit, correct?

11 MR. PETRSORIC: Objection, form.

12 A. That there would be a -- one of these
13 plurality of pump voltages and a load associated
14 with that, and then that would then produce the
15 V out and desired target voltage.

16 BY MR. RIFFE:

17 Q. So when you first said, One of these
18 plurality of pump voltages and there would be a load
19 associated with that, that's not correct, though,
20 right? The loads are associated with V outs. We've
21 established that multiple times today.

22 A. I was reading back from paragraph 7.

1 Maybe I read that wrong.

2 Q. So looking at the claim maybe, since this
3 is in the context of the claim, and you can refer to
4 this paragraph at page 7 of the patent owner
5 response that we've been talking about. Claim 1
6 says: A pumping circuit comprising one or more
7 stages operable to receive a supply voltage and
8 generate a selected one of a plurality of pump
9 voltages, correct?

10 A. Correct.

11 Q. And as we saw in, for example, column 3
12 referencing Figure 3 in the '241 patent,
13 commensurate with what we just read in claim 1, it
14 says at column 3, line 64, with reference to
15 Figure 3 as an example: A charge pump circuit 300
16 comprises a pumping circuit including one or more
17 pump stages operable to receive a supply voltage VCC
18 and generate one or more pump voltages, correct?

19 Did I read that correctly?

20 A. Yes.

21 Q. And that is the pumping circuit that we
22 established earlier shown in Figure 3 that includes

1 the diodes 304, 306, 308, correct?

2 A. I think you said 304, but the --

3 Q. And if I did, I misspoke. The pumping
4 circuit includes at least 306 and 308; is that
5 correct?

6 A. That sounds right.

7 Q. And it -- that pumping circuit generates
8 one or more pump voltages, correct?

9 MR. PETRSORIC: Objection, form.

10 A. To -- and generate a selected one of a
11 plurality of pump voltages.

12 BY MR. RIFFE:

13 Q. And as described in the bottom of
14 column 3, lines 65 to 67, says that that pumping
15 circuit generates one or more pump voltages,
16 correct?

17 A. The pumping circuit 300, including one or
18 more pump stages operable to receive supply voltage
19 and generate one or more pump voltages.

20 Q. And then claim 1 goes on to say: A
21 plurality of loads selectively coupleable to an
22 output of the pumping circuit, each load associated

1 with a specific pump voltage. Okay.

2 Did I read that correctly?

3 A. Yes.

4 Q. And then in column 4 of the '241 patent
5 around line 35 -- 34, it says: The charge pump
6 circuit of the present invention also includes
7 several different loads. Loads can be capacitors or
8 current sinkers. Each load is associated with a
9 different pump output voltage V_{out} , correct?

10 A. Yes, I see that.

11 Q. So the question I have is, is that the
12 pump voltage that's generated by the pumping circuit
13 is not the same as the V_{out} voltage that's
14 referenced in the claims and that is associated with
15 the loads, correct?

16 MR. PETRSORIC: Objection to form.

17 A. That there is a V_{out} that's on the
18 right-most portion of the Figure 3 and each load is
19 associated with a different pump output voltage
20 V_{out} , at least in column 4.

21 BY MR. RIFFE:

22 Q. Okay. And that V_{out} is different from

1 the output voltage of the two-stage pumping circuit,
2 correct?

3 MR. PETRSORIC: Objection to form.

4 A. Well, there would be an output of the
5 pumping stage and then there would be the load
6 that's shown in Figure 3 and measurement at V out.
7 In terms of what those absolute numbers are at any
8 given point in time in operation, I haven't gone
9 into that.

10 BY MR. RIFFE:

11 Q. Going back to page 7 of the patent owner
12 response, is it clear to you what is being
13 referenced by the output voltage of the pumping
14 circuit being dynamically selectable there?

15 A. I don't know that I've analyzed this
16 paragraph in that regard. It mentions a pumping
17 circuit in the second line down and a pumping
18 circuit the third line from the bottom and a pumping
19 circuit in the last sentence.

20 Q. Okay. And so sitting here today, you
21 don't know if it's, the output voltage of the
22 pumping circuit is referencing the voltage that

1 comes out of the two-stage pump, for example, in the
2 Figure 3 embodiment, or whether the output of the
3 pumping circuit is referencing the V out, for
4 example, shown in Figure 3. Is that your testimony?

5 MR. PETRSORIC: Objection, form.

6 A. I guess I would just -- the paragraph
7 states what it states. It mentions the pump
8 voltages of a pumping circuit and loads that are
9 selectively -- that are selectively coupling. And
10 then based on the totality of the claim, it requires
11 that the loads and consequently the output voltage
12 of the pumping circuit be dynamically selectable.

13 MR. PETRSORIC: Tim, we've been going
14 almost 80-plus minutes. Be a good time to take a
15 break.

16 MR. RIFFE: That's fine.

17 (Recess taken from 11:53 a.m. to
18 12:10 p.m.)

19 BY MR. RIFFE:

20 Q. Welcome back, Dr. Brogioli. During the
21 break, did you discuss the substance of your
22 testimony with counsel?

1 A. No.

2 Q. Going back to the patent owner response
3 at page 7 we've been talking about, that last
4 sentence in the first full paragraph. Do you agree
5 with the statement of the patent owner response that
6 says: Based on the totality of the claim that
7 requires the loads and consequently the output
8 voltage of the pumping circuit be dynamically
9 selectable?

10 A. Yes.

11 Q. And then going back to the '241 patent,
12 Figure 3, could you now draw a box around what you
13 believe is the pumping circuit shown in Figure 3 --

14 MR. PETRSORIC: Objection, asked and
15 answered.

16 BY MR. RIFFE:

17 Q. -- on your copy of the patent?

18 A. So I think as we had talked about
19 earlier, it is -- for the pumping -- the pumping
20 circuit would be this portion receiving the VCC in
21 through -- I think we talked about earlier the
22 transistor 308 here.

1 Q. Are you able to draw a box around that if
2 I give you a pen? And then mark it as pumping
3 circuit on Figure 3.

4 A. (Witness complies.)

5 Q. And likewise for Figure 7, could you
6 refer to Figure 7 of the '241 patent. And are you
7 able to draw a box around the pumping circuit of
8 Figure 7 as you just did for Figure 3?

9 A. Looks like I'm pointing -- I'm going back
10 to I guess the language in column 5 for charge pump
11 circuit 700 includes a pumping circuit 100 as shown
12 in Figure 1. That looks like the pumping circuit in
13 this figure.

14 Q. Is pump 100 referenced in Figure 7; is
15 that correct?

16 A. That looks right.

17 Q. Okay. So you would not include any of
18 the other components shown in Figure 7 as part of
19 the pumping circuit; is that correct?

20 MR. PETRSORIC: Objection to form.

21 (Witness reviews document.)

22 A. So if I'm reading the description of 7

1 right, I think the pump 100 here is just a --
2 perhaps a two-stage pump from the background
3 section.

4 BY MR. RIFFE:

5 Q. Where do you see that reference that's in
6 Figure 7 embodiment?

7 A. Figure 7 points to pump 100. If I look
8 at column 5 -- that's done on Figure 6. Sorry,
9 column 5, roughly at 58, the charge pump circuit 700
10 includes pumping circuit 100 as shown in Figure 1.

11 Q. Okay.

12 A. So the 100 in Figure 7 looks to be the
13 same as the 100 in Figure 1. It talks about in
14 column 1 at 23, Figure 1 shows a schematic of a
15 typical two-stage charge pump circuit 100 with --
16 I'm sorry, that generates a boosted output voltage
17 V_{pump} with a magnitude that is greater than the
18 magnitude of the supply voltage V_{CC} supplied by the
19 source 102.

20 Q. Okay. So to be clear, Figure 7
21 embodiment refers to pump 100 which is further --
22 pumping circuit 100, I apologize, which at column 5

1 is referring to -- strike that.

2 To be clear, in the Figure 7 embodiment
3 it references pump 100. Column 5 goes on to
4 reference pumping circuit 100 as shown in Figure 1,
5 correct, which is a two-stage pump?

6 A. That's right.

7 Q. So you would include the componentry of
8 Figure 1 in the pump 100 of Figure 7, correct?

9 A. I think the language is stating that the
10 two-stage pump of Figure 1 block 100 is the same
11 block 100 as Figure 7.

12 Q. So is it also fair to say that the
13 Figure 1 pumping circuit 100 is an example of the
14 pumping circuit 100 referenced and shown in
15 Figure 7?

16 A. I think that's what the specification is
17 describing. I don't recall addressing this in my
18 declaration, but I think that's what it's saying.

19 Q. Okay. So going back to this sentence in
20 the patent owner response at page 7 that you agreed
21 with. So in order to practice claim 1 of the '241
22 patent, the loads of the charge pump have to be

1 dynamically selected during operation. And as we
2 talked about, during operation means after you
3 figuratively would flip the switch on the charge
4 pump, correct?

5 A. That they're dynamically selectable. And
6 one example would be if -- on turning on the device
7 or booting up, for lack of a better phrase, a
8 configuration is read and used to selectively couple
9 the load. That would be dynamically selectable.

10 Q. And in your opinion, to practice claim 1
11 of the '241 patent, the output voltage of the
12 pumping circuit has to be dynamically selectable
13 during operation, correct?

14 MR. PETERSORIC: Objection, form.

15 A. Well, if there's the plurality of loads
16 that are selectable associated with the output of
17 the pumping circuit like we were talking about in
18 Figure 3, and if those loads and the output are
19 dynamically selectable.

20 BY MR. RIFFE:

21 Q. Did you say the loads and the output are
22 dynamically selectable?

1 A. The loads and that -- yeah, the output
2 voltage, they're dynamically selectable.

3 Q. And is that output voltage the output
4 voltage of the pumping circuit as referenced in this
5 sentence or is it the V out that is associated with
6 the loads?

7 A. So the -- I'm going back to the Figure 3
8 that we were talking about. If we're looking at,
9 for instance, the output of -- this transistor 308
10 and the node to the right, these are all the same.
11 There's the label V out on the far right of
12 Figure 3, but they would be at the same level when
13 there's, loads are attached and the device is
14 operational.

15 Q. I'm not sure I followed you. You're
16 saying the voltage coming out of the diode -- or at
17 the second stage of the pumping circuit to the right
18 of 308 would be the same as V out? I thought you
19 said earlier it would be different because the loads
20 would be applied to that voltage coming out of the
21 pumping circuit.

22 MR. PETERSORIC: Objection, form.

1 A. I think what we were discussing earlier
2 was that the behavior of that voltage along those
3 nodes changes depending on if there's a load
4 attached or not.

5 BY MR. RIFFE:

6 Q. Okay. And if there is no load attached,
7 you're saying that V out would equal the output
8 voltage from the pumping circuit, correct?

9 MR. PETRSORIC: Objection, form.

10 A. I would say that if there's no load
11 attached, the voltage across this line going to
12 V out will be something; if there's a load attached,
13 the behavior changes and those values would change.

14 BY MR. RIFFE:

15 Q. The values would -- the values you're
16 referring to changing would be the voltage coming
17 out of the two-stage pumping circuit versus the
18 V out of the charge pump itself, correct?

19 MR. PETRSORIC: Objection, form.

20 A. I would say the voltage -- this same
21 voltage is going to be at each of the nodes along
22 this V outline coming from your 308.

1 BY MR. RIFFE:

2 Q. So just one final question hopefully on
3 this. If a load is applied, load A, B or C in
4 Figure 3, is the voltage that comes out of this
5 two-stage pumping circuit, would that be the same as
6 V out in one of those conditions? Wouldn't it
7 necessarily have to be different?

8 MR. PETRSORIC: Objection, form.

9 A. I would say that if there's no load
10 attached, there's going to be some behavior. You'll
11 see a V out, you'll see another -- you'll see a
12 voltage measurement at V out. You'll have the same
13 measurement along this horizontal line. The
14 behavior of that voltage or signal along the
15 horizontal line then changes if one of those loads
16 is added.

17 BY MR. RIFFE:

18 Q. So if I measure the voltage at the edge
19 of -- at the outside -- strike that.

20 If I measure the voltage at the exit of
21 the two-stage pumping circuit in Figure 3 and a load
22 B is applied, will the measured voltage be the same

1 between V out and the voltage that I measure at the
2 output of the pumping circuit in that condition?

3 MR. PETRSORIC: Objection to form.

4 A. With a load connected to this line in
5 Figure 3 going from 308 right towards V out, you'll
6 see the same signal along that line if -- with a
7 given load attached to it.

8 BY MR. RIFFE:

9 Q. And will the voltages be the same at the
10 two locations?

11 A. If we're talking about the same thing, it
12 would be the same, yes.

13 Q. Well, are they the same?

14 A. Yes, if they're both connected to the
15 same potential.

16 Q. And -- okay. If the output voltage of
17 the pumping circuit cannot be dynamically adjusted,
18 then you would agree that that's outside the scope
19 of the claim, correct?

20 To be specific, claim 1 of the '241
21 patent.

22 MR. PETRSORIC: Objection to form.

1 A. So it sounds like what you're asking is
2 if I've got in claim 1, limitation A -- column 8,
3 line 18: A pumping circuit comprising one or more
4 stages operable to receive a supply voltage and
5 generate a selected one of a plurality of pump
6 voltages.

7 If I remove the generate a selected one
8 of a plurality of pump voltages, that doesn't seem
9 to be within -- that doesn't seem to be what the
10 claim limitation is talking about.

11 BY MR. RIFFE:

12 Q. And just saying another way, if the
13 output voltage of the pumping circuit cannot be
14 dynamically selectable, then that's outside the
15 scope of claim 1, correct?

16 A. I guess I haven't offered a construction
17 of the term "dynamically selectable." I don't see
18 that explicit phrase in the claim language.

19 Q. Well, you agreed with the patent owner at
20 the patent owner response on page 7 that says:
21 Based on the totality of the claim, it requires that
22 the loads and consequently the output voltage of the

1 pumping circuit be dynamically selectable.

2 So if the output voltage of the pumping
3 circuit cannot be dynamically selectable, then based
4 on your agreement with the patent owner it would be
5 outside the scope of the claims of the '241 patent,
6 correct?

7 A. Yeah, in terms of what we were discussing
8 before. I was just raising the point that I
9 didn't -- I wasn't saying that explicit phrase was
10 in the claim.

11 Q. Well, do you agree or not with the patent
12 owner that the claims required this dynamically
13 selectable language?

14 A. That they require that behavior to what's
15 described in the claims, yes.

16 Q. And what is described in the claims as
17 dynamically selectable, in your opinion?

18 A. I would say it's at least just as claim 1
19 describes. The pumping circuit that generates the
20 selected -- one of these plurality of pump voltages,
21 the plurality of loads that are selectively
22 coupleable to the output of the pumping circuit and

1 the load selector selectively coupling a load -- I'm
2 sorry -- with a specific pump voltage.

3 Q. And in your opinion, a charge -- strike
4 that.

5 In your opinion, a pumping circuit that
6 generates one pump voltage is not dynamically
7 selectable; is that correct?

8 MR. PETRSORIC: Objection, form.

9 A. I -- the dynamically selectable is in the
10 context of the claim itself. I haven't looked at --
11 if you're asking if a single charge pump that only
12 generates one output voltage is equivalent to claim
13 1, I haven't said that.

14 BY MR. RIFFE:

15 Q. So I'm just asking you if you agree with
16 the patent owner that the claims require that the
17 output voltage of a pumping circuit be dynamically
18 selectable and if the output voltage of the pumping
19 circuit cannot be dynamically selectable, then you
20 would agree that that pumping circuit is outside the
21 scope of the claim, correct?

22 MR. PETRSORIC: Objection to form.

1 A. I guess I would say that the claims talk
2 about the loads and the output voltage of the
3 pumping circuit being dynamically selectable. If
4 that's not met, then those things wouldn't be
5 dynamically selectable.

6 BY MR. RIFFE:

7 Q. And just so I'm clear on what, your
8 understanding, dynamically selectable means in the
9 context of the pumping circuit, not the loads, is it
10 my understanding that your understanding of
11 dynamically selectable in the context of the pumping
12 circuit is that it has to generate a selected one of
13 a plurality of pump voltages to be dynamically
14 selectable?

15 MR. PETRSORIC: Objection to form.

16 A. I would say that at least in the context
17 of claim 1 that for the pumping circuit it's
18 something comprising one or more stages that are
19 operable to receive a supply voltage and generate a
20 selected one of a plurality of pump voltages.

21 BY MR. RIFFE:

22 Q. And you would agree with me that as

1 described in column 3, that the pumping circuit
2 including one or more pump stages operable to
3 receive a supply voltage VCC and generate one or
4 more pump voltages is commensurate with claim 1 of
5 the '241 patent, correct?

6 A. That looks like what the patent's talking
7 about in the context of the embodiment for Figure 3.

8 Q. Does the circuit recited in claim 1 of
9 the '241 patent require the output voltage from the
10 pumping circuit to be selectable from among a group
11 of possible output voltages?

12 A. What the claim mentions in limitation A
13 is that the pumping circuit can generate a selected
14 one of a plurality of pump voltages.

15 Q. And does that mean that the output
16 voltage from the pumping circuit has to be
17 selectable from a group of possible output voltages,
18 in your opinion?

19 A. I don't recall, in my declaration,
20 talking about the language of a group. Maybe you
21 can point me to my declaration. I don't see that
22 word in this claim.

1 Q. Does the patent require the output
2 voltage from the pumping circuit to be selectable
3 from one of a plurality of pump voltages?

4 A. It states in claim 1 that the pumping
5 circuit generate a selected one of a plurality of
6 pump voltages.

7 Q. If a pumping circuit only generates one
8 pump voltage, is that, in your opinion, covered by
9 the -- claim 1 of the '241 patent?

10 MR. PETRSORIC: Objection, form.

11 A. That the pumping circuit has to be
12 capable of this -- generating the selected one of
13 the plurality of -- of pump voltages.

14 BY MR. RIFFE:

15 Q. So then you'd agree that a pumping
16 circuit that generates only one pump voltage is
17 covered by the claims of the '241 patent, correct?

18 MR. PETRSORIC: Objection to form.

19 A. With the -- the -- claim 1 is talking
20 about the -- a pumping circuit that can generate one
21 of a plurality of these pump voltages. So if I've
22 got A, B, C, D, E, it can generate C, for example.

1 BY MR. RIFFE:

2 Q. So you would agree if the pumping circuit
3 can generate one pump voltage, it's covered by the
4 claims of the '241 patent, correct?

5 MR. PETRSORIC: Objection to form.

6 A. That doesn't seem to be what this
7 limitation is saying. It's saying generate a
8 selected one of a plurality of pump voltages.

9 BY MR. RIFFE:

10 Q. So in your interpretation of that, that
11 means that the pumping circuit has to be able to
12 generate one of voltage A, B or C, for example, to
13 be in accordance with the claim language?

14 A. That there be that plurality of pump
15 voltages of which the pump's going to generate the
16 selected one, yeah.

17 Q. Can you show me or tell me where in the
18 '241 patent that the selection of either the loads
19 or the output voltage of the pump circuit has to be
20 made during operation; i.e., after you flip the
21 switch on the charge pump?

22 A. I'd have to go back through the

1 specification for you. I don't recall in my
2 declaration explicitly discussing this, unless you
3 want to point me to somewhere that I do.

4 Q. Yeah, I'm -- I'm having a hard time
5 finding it as well. And this goes to sort of this
6 dynamically selectable language that's in the patent
7 owner response that we've been talking about. And
8 the example that we used was sort of flipping on the
9 switch and you said that there would be a selection
10 made at that point in time. I'm just wondering
11 where in the '241 patent it describes that type of
12 dynamic selectability.

13 A. Well, I guess first the example I gave
14 you is perhaps one example of the selectable nature
15 here. Let me, I guess, go back to the specification
16 for you.

17 (Witness reviews document.)

18 A. I'll note even in the -- so I'm in column
19 3, the summary of the invention. It has language
20 such as at line 13: A load selector means couples a
21 selected load to the output according to the target
22 pump voltage. In conclusion, a new approach to

1 select dynamically the best load for a pump as a
2 function of the target output voltage.

3 So these are all describing things of
4 performing the selection or dynamically performing
5 the selection.

6 BY MR. RIFFE:

7 Q. And that's in the context of dynamically
8 selecting the load, correct?

9 A. It's talking about the patent's novel
10 approach to dynamically selecting the best load for
11 the pump.

12 Q. Do you know where the patent talks about
13 dynamically selecting the output voltage of the
14 pumping circuit?

15 (Witness reviews document.)

16 A. So it looks to me, this is even generally
17 talked about in the summary of the invention section
18 where it's talking about the charge pump circuit and
19 the pumping circuit and the various loads and
20 selectability.

21 BY MR. RIFFE:

22 Q. But you'll agree with me that the only

1 discussion of selectability in the summary of the
2 invention section of the '241 patent is with respect
3 to selecting the best load for the pump, correct,
4 not about the output voltage from the pumping
5 circuit?

6 MR. PETRSORIC: Objection, form.

7 A. Well, that statement says: A new
8 approach to select dynamically the best load for a
9 pump as a function of the target output voltage.

10 BY MR. RIFFE:

11 Q. Right. That's talking about dynamically
12 selecting the load, though, correct?

13 A. The load for the pump as the function of
14 the target output voltage.

15 Q. And that target output voltage is V out
16 as referenced, for example, in column 4 at lines 35
17 to 36?

18 A. That sentence in column 4 is referring to
19 V out.

20 Q. Now, in the patent owner response,
21 page 8, the patent owner goes on to state at the top
22 of the page -- give you a minute to get back there.

1 A. Okay.

2 Q. It says: Moreover, the other limitations
3 of the claim, referring to claim 1, reinforce that
4 the output voltage of the pumping circuit be
5 dynamically selectable.

6 It says: First, limitation B requires
7 that there be a plurality of loads selectively
8 coupleable to an output of the pumping circuit, each
9 load associated with a specific pump voltage.

10 They go on to say: Because each load is
11 associated with a specific pump voltage, i.e., each
12 load is clearly tied to a particular pump voltage,
13 this limitation reinforces that the pumping circuit
14 must be able to generate two or more pump voltages.

15 Do you agree with that statement that the
16 limitation reinforces that the pumping circuit must
17 be able to generate two or more pump voltages?

18 A. That looks to be correct, yes.

19 Q. Well, you agree with me that the '241
20 patent doesn't say that the pumping circuit must be
21 capable of generating two or more pump voltages,
22 correct?

1 MR. PETRSORIC: Objection to form.

2 A. That seems to be what's being described
3 even in the rest of this paragraph. And it looks
4 like one of the prior experts, Dr. Subramanian,
5 stated.

6 BY MR. RIFFE:

7 Q. Well, claim 1 of the '241 patent just
8 requires that the pumping circuit generate a
9 selected one of a plurality of pump voltages,
10 correct?

11 (Witness reviews document.)

12 A. That the limitation A of claim 1 states
13 generate a selected one of a plurality of pump
14 voltages.

15 BY MR. RIFFE:

16 Q. You would agree with me that that
17 limitation only requires that the pumping circuit
18 generate one of a plurality of pump voltages,
19 correct, not that the pumping circuit must be able
20 to generate two or more pump voltages, correct?

21 (Witness reviews document.)

22 A. I would just go back to the limitation A

1 that's stating the pumping circuit is to generate a
2 selected one of a plurality of pump voltages, and
3 pump voltage is described in the remaining claim
4 elements.

5 BY MR. RIFFE:

6 Q. But you agree with me that what you just
7 read, the claim language says generate a selected
8 one of pump voltages. The patent owner response at
9 page 8 says: This limitation reinforces that the
10 pumping circuit must be able to generate two or more
11 pump voltages.

12 That's an incorrect statement in the
13 patent owner response in view of claim 1, correct?

14 MR. PETRSORIC: Objection, asked and
15 answered.

16 A. I don't -- no, that statement seems
17 correct. The language of the claim is stating the
18 pumping circuit comprising one or more stages
19 operable to receive a supply voltage and generate a
20 selected one of a plurality of pump voltages.

21 BY MR. RIFFE:

22 Q. So given that statement in the claim, you

1 think the pumping circuit must be able to generate
2 two or more pump voltages, then, correct?

3 MR. PETRSORIC: Objection, form.

4 A. That sounds like that statement is in the
5 patent owner responses, correct. The claim is
6 talking about the plurality of pump voltages.

7 BY MR. RIFFE:

8 Q. If we look at the column 3 statement
9 describing Figure 3 embodiment that we looked at
10 several times today, it describes a pumping circuit
11 including one or more pump stages operable to
12 receive a supply voltage VCC and generate one or
13 more pump voltages, correct?

14 A. I see that language, yes.

15 Q. Can you square that language with what's
16 noted in the patent owner response where they say
17 the limitation requires the pumping circuit must be
18 able to generate two or more pump voltages?

19 (Witness reviews document.)

20 A. So it -- at the bottom of column 3 is
21 stating that the charge -- sorry. The pumping
22 circuit including one or more pump stages operable

1 to receive a supply voltage and generate one or more
2 pump voltages. And then citations in column 4, for
3 example, are talking about a pump voltage VA and a
4 first switch and a pump voltage VB and a second
5 switch, et cetera.

6 BY MR. RIFFE:

7 Q. And how does that square the language
8 between the patent owner response saying that the
9 pumping circuit must be able to generate two or more
10 pump voltages with the language in the '241 patent
11 that says the pumping circuit generates one or more
12 pump voltages? Seems to be different, correct?

13 A. Claim 1 is describing the pumping circuit
14 and it generating a selected one of a plurality of
15 pump voltages.

16 Q. And that, to me, means you can generate
17 one or more pump voltages, which lines up with the
18 column 3 statement of the '241 patent, correct?

19 MR. PETRSORIC: Objection, form.

20 A. I would say the column 3 language at 65
21 states the pumping circuit including one or more
22 pump stages operable to receive a supply voltage and

1 generate one or more -- one or more pump voltages.
2 And the language in claim 1 stating the pumping
3 circuit comprises one or more stages operable to
4 receive a supply voltage and generate a selected one
5 of a plurality of pump voltages.

6 BY MR. RIFFE:

7 Q. Right. In both of those instances, the
8 claim 1 and the column 3 description that you just
9 described say nothing about the pumping circuit must
10 be able to generate two or more pump voltages,
11 correct?

12 MR. PETRSORIC: Objection, form.

13 A. Well, the language is just as it is in
14 claim 1, stating that the pumping circuit portion
15 generate a selected one of the plurality of these
16 pump voltages.

17 BY MR. RIFFE:

18 Q. Right. And that does not mean that that
19 pumping circuit must be able to generate two or more
20 pump voltages, correct? If it creates one, that's
21 sufficient for claim 1 in view of the discussion of
22 column 3 with respect to the pumping circuit of

1 Figure 3, correct?

2 MR. PETRSORIC: Objection to form.

3 A. Well, no. The language in the paragraph
4 of the patent owner response states: The limitation
5 reinforces that the pumping circuit must be able to
6 generate two or more pump voltages.

7 BY MR. RIFFE:

8 Q. So a pumping circuit that can only
9 generate one pump voltage is not within the
10 limitations of claim 1 of the '241 patent, in your
11 opinion; is that correct?

12 A. That claim 1 is talking about a pumping
13 circuit that in this limitation A generates a
14 selected one of the plurality of voltages.

15 Q. So if a pumping circuit only can generate
16 one pump voltage, is that in or outside of the
17 limitations of claim 1 of the '241 patent, in your
18 opinion?

19 A. If you're asking about a pumping circuit
20 that has a different claim limitation A where there
21 is no generating a selected one of a plurality of
22 pump voltages, that sounds different to me than what

1 claim 1 and the limitation A of it are describing.

2 Q. And although the output voltage must be
3 selected, in your opinion, you agree that nothing in
4 the term's plain meaning precludes making the
5 selection only once during the design phase, for
6 example, or otherwise requires that the output
7 voltage must be dynamically selectable, correct?

8 A. Can you repeat the question?

9 Q. Yeah. And although the output voltage
10 must be selected, you agree that nothing in the
11 term's plain meaning precludes making the selection
12 only once during the design phase, for example, or
13 otherwise requires that the output voltage must be
14 dynamically selectable, correct?

15 MR. PETRSORIC: Objection to form.

16 A. I need you to be more specific in what
17 you're referring to as once at the design stage.

18 BY MR. RIFFE:

19 Q. So in other words, if the selection of
20 the output voltage is made during design, is that
21 part of the claim 1A selection limitation, in your
22 opinion?

1 A. It sounds like -- and I discuss this in
2 the context of Doluca. If there's a design
3 parameter like the value of K in Doluca that's
4 chosen, that's not selectable. That's just a -- a
5 parameter in the circuit. But there can be ways --
6 and I think I talked about this in some of the
7 products in my infringement report -- that the
8 selection can also be made at a design time if
9 you're -- the way the parts are manufactured and
10 tested in manufacturing, that there's selectability
11 there as well.

12 Q. And is that dynamic selectability if
13 you're doing that during the manufacturing stage, in
14 your opinion? Strike that.

15 Is that dynamic selectability when you're
16 making that decision at the design phase, in your
17 opinion?

18 MR. PETRSORIC: Objection to form.

19 A. We'd need to be more specific about the
20 design. I mean, you can have a product where
21 there's dynamic selectability chosen or baked in at
22 manufacturing and test based on artifacts of the

1 semiconductor performance or binning or something
2 like that.

3 BY MR. RIFFE:

4 Q. When I asked you earlier about where in
5 the patent does it -- does it discuss dynamic
6 selectability of the output voltages, you pointed to
7 the summary of the invention. Were you able to
8 locate any additional sections of the '241 where the
9 patent mentions output voltages being dynamically
10 selectable?

11 A. I'll have to go back through this section
12 for you. And your question is?

13 Q. Where in the patent does the '241 patent
14 describe output voltages being dynamically
15 selectable outside of the summary of invention that
16 you described earlier? I just want to make sure
17 that I've allowed you an opportunity to identify any
18 other sections that you believe supports that.

19 (Witness reviews document.)

20 A. This is -- so I would say it's generally
21 talked about just as the patent owner response says.
22 The other limitations of claim 1 and selectability

1 is talked about, for instance, in this description
2 in column 4 with things like at the top of column 4,
3 different loads connectable via respective switches
4 and discussion of how those switches and
5 connectivity operate for selecting.

6 BY MR. RIFFE:

7 Q. Anything else?

8 A. I would say probably it's talked about in
9 this section as a whole in various places.

10 Q. And that section being the summary of the
11 invention?

12 A. No, no. I'm talking about the detailed
13 description of the preferred embodiment through
14 column 4 here. At least as one example.

15 Q. And that's your testimony as to where the
16 '241 patent talks about the dynamic selectability of
17 the output voltage from the pumping circuit,
18 correct?

19 MR. PETRSORIC: Objection to form.

20 A. I would say, again, I was referring to at
21 least claim 1 and some of the language here in
22 columns 3 and 4 talking about the load selector and

1 the load selector selectively coupling these loads
2 and the behavior of the pump itself.

3 BY MR. RIFFE:

4 Q. Referencing back to Figure 3 and the
5 pumping circuit you have identified there in
6 Figure 3. Would you agree that you could modify the
7 pump voltage from the pumping circuit by modifying
8 VCC, the supply voltage?

9 A. I think if you changed the value of VCC
10 coming in, you would change the behavior of the
11 circuit.

12 Q. And would that change the value of the
13 pump voltage coming from that pumping circuit if you
14 changed VCC?

15 A. Barring looking at other components and
16 settings, I think that's possible, yes.

17 Q. Referencing Figure 6 as we did for
18 Figures 3 and 7, could you identify the pumping
19 circuit in Figure 6?

20 (Witness reviews document.)

21 A. It looks like Figure 6 refers to the pump
22 circuit as the block labeled pump with the label 100

1 and I think it's referring back similarly to that
2 Figure 1.

3 BY MR. RIFFE:

4 Q. So similar to the Figure 7 embodiment
5 where it refers to the pump circuit 100 as described
6 in Figure 1; is that correct?

7 A. That's right. As described a little
8 further down in column 5.

9 Q. And specifically at column 5, lines 45 to
10 47; is that correct?

11 A. For Figure 6, yes. I was referring to
12 Figure 7 that's around line 54 as well.

13 Q. That's fair. Just for the record, so
14 with respect to Figure 6, you're referencing the
15 pumping circuit 100 described in column 5, lines 45
16 through 47; is that correct?

17 A. That's correct.

18 Q. You mentioned you have the Le exhibit or
19 the Le reference with you, which is at Micron 1008
20 exhibit?

21 A. Yes. At least I'm pretty sure I did.
22 It's here somewhere. Here it is. Okay.

1 Q. Would you agree that Le discloses a
2 charge pump incorporating stages that use variable
3 bootstrap capacitors?

4 A. As I recall, Le talks about various
5 stages even in the abstract. And I think going back
6 to my declaration, if I recall, uses the phrase
7 "bootstrap capacitor," "bootstrap capacitors."

8 Q. If you reference your declaration, which
9 is Exhibit 2013, at paragraph 79, does that refresh
10 your recollection as to Le disclosing a charge pump
11 incorporating stages that use variable bootstrap
12 capacitors?

13 A. That's correct. Le talks about the
14 bootstrap capacitor values within the stages.

15 Q. Le also discloses using a shunt regulator
16 to manage the voltage ripple on the output, correct?

17 MR. PETRSORIC: Objection to form.

18 A. Looks like Le -- I'm in paragraph 79,
19 mentions in the context of prior art charge pumps
20 using shunt regulators.

21 BY MR. RIFFE:

22 Q. In paragraph 80 that's on page -- that

1 goes over to page 40 of your declaration, under that
2 first bullet you had quoted: Consequently, a shunt
3 regulator circuit which may operate in conjunction
4 with such a charge pump circuit will consume less
5 power and regulate the charge pump output with less
6 ripple than with conventional charge pump circuits.

7 Do you see that?

8 A. That's right. Le talks about that in his
9 column 6 at 21.

10 Q. And that's in conjunction -- strike that.

11 And at column 6, lines 21 through 25,
12 that is in conjunction with the description of Le's
13 combination of an improved charge pump circuit with
14 the shunt regulator; is that correct?

15 A. In Le's design he's describing a shunt
16 regulator circuit that may operate in conjunction
17 with the charge pump circuit to consume less power.
18 Or it will consume less power I should say.

19 Q. And is that due to the changes that Le
20 describes to the charge pump circuit with respect to
21 the use of less power?

22 A. That Le talks about using Le's pump and

1 Le's shunt regulator, but the way that Le operates
2 and by reducing the amount -- the amount of shunting
3 that occurs in Le, there's a -- there's a reduced --
4 or a reduction in power consumption or improved
5 power savings.

6 Q. And Le describes that the amount of
7 shunting that occurs in Le being reduced is a result
8 of the changes that Le makes to the charge pump; is
9 that correct?

10 (Witness reviews document.)

11 A. That seems to be generally what Le is
12 getting at from the bottom of column 10 at 61 to 11
13 at 6, that Le is talking about the shunt in Le's
14 charge pump circuit -- or in his invention. And
15 problems with prior art charge pump circuits that
16 resulted in efficiencies with shunting because of
17 voltage levels.

18 And then Le states the very bottom of
19 column 10: The charge pump circuit of the present
20 invention reduces an amount of shunting by the
21 regulator, thereby reducing power.

22

1 BY MR. RIFFE:

2 Q. And Le doesn't disclose any specific
3 shunt regulator structure, to your knowledge, does
4 it?

5 MR. PETRSORIC: Objection, form.

6 (Witness reviews document.)

7 A. I think at least as I talk about in my
8 declaration, Le is just referring to it as a shunt
9 regulator 270.

10 BY MR. RIFFE:

11 Q. Okay. I believe you referenced this
12 earlier, but you'd agree that Le discloses that
13 using a shunt regulator leads to, quote, Further
14 reduction in power consumption, end quote, when used
15 in conjunction with the charge pump circuit of Le as
16 compared to when used with conventional charge pump
17 circuits, correct?

18 And that's at Le 6:21 through 26.

19 A. That looks like what I'm discussing at
20 the top of my page 40, that the shunt regulator
21 circuit operating in conjunction with Le or such a
22 charge pump consumes less power.

1 Q. And also Le describes that using a shunt
2 regulator, quote, Advantageously provides a smaller
3 ripple, end quote, right? And that's Le at 10:61 to
4 column 11, line 6.

5 MR. PETERSORIC: Objection, form.

6 A. That Le talks about in the context of
7 Le's invention with his charge pump circuit as a
8 whole reducing the amount of the shunting by the
9 regulator and thereby getting the reduction in
10 power, power consumption.

11 BY MR. RIFFE:

12 Q. And then at the column 11, line 3 through
13 6, he says — Le says: Further, since the charge
14 pump output of the present invention exhibits a
15 slower rise time due to its modulation, the shunt
16 regulator advantageously provides a smaller ripple
17 voltage at its regulation output.

18 Do you see that?

19 A. Yes.

20 Q. In paragraph 84 of your declaration you
21 say that: Le's design goal is to minimize use of
22 the shunting regulator to minimize power consumption

1 within the memory device, right?

2 A. That's right.

3 Q. Do you know where in Le that it says that
4 reducing use of a shunt regulator is a specific
5 design goal?

6 A. Le generally talks about the desire to
7 minimize power consumption in the memory devices
8 Le's talking about, and that the way Le uses his
9 shunting regulator helps achieve that goal.

10 Q. And the way he use -- the way Le uses the
11 shunting regulator is in conjunction with the
12 improved charge pump circuit which permits less use
13 of the shunting, I think as you said earlier, which
14 reduces overall power consumption; is that correct?

15 MR. PETERSORIC: Objection to form.

16 A. That I think Le exactly states, and I'm
17 on page 40 of my declaration, which is Le at 10:61:
18 The charge pump circuit of the present invention
19 provides for a further reduction in power
20 consumption when used in conjunction with a shunt
21 regulator.

22

1 BY MR. RIFFE:

2 Q. So it's the charge pump circuit that is
3 driving the reduction in power consumption, is that
4 correct, based on that bullet you have here on
5 page 40 of your declaration?

6 A. I would say that it's the charge pump
7 circuit used in conjunction with Le's shunting and
8 the way Le operates that provide these power
9 consumption benefits.

10 Q. You would agree with me that Le's main
11 design goal was the changes to the charge pump
12 circuit as compared to the prior art charge pump
13 circuits, correct?

14 A. That Le generally is talking about his
15 new and improved charge pump design for these flash
16 memory devices. And as part of this design is
17 getting -- is focused on the power consumption
18 improvements.

19 Q. And he noted -- Le noted that one problem
20 in the prior art was that in -- and I'm reading at
21 column 3, lines 31 through 40: One problem in the
22 prior art was that, quote, In conventional methods

1 large capacitor values may be used to compensate for
2 the lowest power supply voltage, end quote.

3 Do you see that?

4 A. What was your line number?

5 Q. 31 through 40 in column 3.

6 A. Maybe I'm missing -- maybe I'm not
7 looking in the right place.

8 Q. It's possible I had the wrong citation
9 here. So about middle way through that paragraph on
10 column 3, lines 31 through 40, Le states that: In
11 the conventional method large capacitor values may
12 be used to compensate for the lowest power supply
13 voltage.

14 Do you see that?

15 A. Yes.

16 Q. And that was -- that was one of the
17 problems that Le had noted in prior art devices,
18 correct, were these large capacitor values?

19 A. That's one thing Le's talking about in
20 the solutions he's contemplating.

21 Q. And further Le goes on to say that the
22 use of large capacitor values wastes power supply

1 charge, right, further down in that paragraph?

2 A. That's correct.

3 Q. And so the problem that Le is
4 identifying -- some of the problems that he's
5 identifying is wasted charge stored in the
6 capacitors, correct?

7 MR. PETRSORIC: Objection to form.

8 A. He talks about the wasting of power
9 supply charge, which in this paragraph is being
10 shorted to ground through a shunt and it's
11 negatively impacting the pump efficiency. There's
12 an overall loss of efficiency.

13 BY MR. RIFFE:

14 Q. And you would agree that Le's not just
15 talking about the use of the shunt regulator alone
16 being an issue in these prior art devices but
17 perhaps at best the combination of the shunt
18 regulator and the prior design of these charge pump
19 circuits, correct?

20 A. He's talking about problems in terms of
21 pump efficiency and power when you're using the
22 shunts with these larger capacitors and how that's

1 impacting your power -- or your power negatively.

2 Q. Let's turn to paragraph --

3 MR. PETRSORIC: Tim, it's almost 20
4 after 1 if it -- if it's a good breaking point and
5 before, if you're going to shift gears.

6 MR. RIFFE: Yeah, I think we can take
7 a quick lunch break. Go off the record.

8 (Recess taken from 1:18 p.m. to
9 2:06 p.m.)

10 BY MR. RIFFE:

11 Q. Welcome back, Dr. Brogioli. Did you have
12 any discussions with your counsel about the
13 substance of your testimony today during the lunch
14 break?

15 A. No. I did not, no.

16 Q. Dr. Brogioli, let's turn to paragraph 71
17 of your declaration. And this is in context of the
18 combination of the Doluca and Buti references.

19 It's your opinion that the combination of
20 Doluca and Buti does not meet the corresponding
21 structure for the load selector means terms,
22 correct?

1 A. That's correct, yes.

2 Q. And that's because you say that the
3 inverters, buffers and comparators disclosed are not
4 operated exclusively to one another in the
5 combination, right?

6 A. In this combination of Dr. Dickens,
7 that's right, yes.

8 Q. You specifically say, I think, in
9 paragraph 71: Each of Dr. Dickens' variations, each
10 inverter, buffer, comparator is not operated
11 exclusively to the other inverter, buffer,
12 comparator, meaning multiple loads can be coupled to
13 the output of Doluca's pump circuit at a time
14 depending on the diode stack, correct?

15 A. That's correct.

16 Q. And you say: This is contrary to the
17 operation of the corresponding structure in the
18 specification of the '241 patent, correct?

19 A. That's correct.

20 Q. Do you provide any other reason why the
21 combination of Doluca's pump circuit and Buti does
22 not meet the limitation of the load selector means

1 other than what's stated in paragraph 71?

2 A. So this paragraph 71 is providing a
3 summary of my discussion in the prior paragraphs
4 starting at paragraph 66. So I would point us to
5 that section as a whole.

6 Q. You don't disagree that the loads in the
7 Buti/Doluca combination are adjustable, though,
8 right?

9 MR. PETRSORIC: Objection, form.
10 (Witness reviews document.)

11 A. Looks like the circuit of Buti, those
12 inverters are not exclusively active, so mult of
13 them are in use at a time. And so it really is
14 just -- it's at best changing the rate at which the
15 block of Buti can bleed off depending on how many of
16 these pathways are enabled.

17 BY MR. RIFFE:

18 Q. So your point is that -- your point is
19 not that the bleeder circuit of Buti and the
20 individual transistors can't be selected or
21 adjusted, it's just that your position is that those
22 transistors are not exclusively selectable, again,

1 exclusive of the other switches; is that correct?

2 MR. PETRSORIC: Objection to form.

3 A. That I would say is in part, but there's
4 also the issue of the voltage of the combined
5 circuit for the capacitor plate line, even with the
6 use of Buti as Dr. Dickens talks about, still
7 results in the same behavior I think as I talk about
8 in paragraph 70, for example.

9 BY MR. RIFFE:

10 Q. You have the Buti reference in front of
11 you, I believe. Micron 1005.

12 A. Okay.

13 Q. And referencing the Buti reference,
14 Micron 1005, can you turn to Figure 3A of Buti.

15 A. Okay.

16 Q. And you would agree that the loads in
17 Buti's circuit shown in Figure 3A are the
18 transistors denoted as 42, 48, 54 and 60, correct?

19 (Witness reviews document.)

20 A. That I'm pointing to these transistors
21 60, 54, 48 and 42 and that those -- multiple of
22 these loads are coupled to the output of what looks

1 like the Doluca pump circuit.

2 BY MR. RIFFE:

3 Q. Did you mean to say the Doluca pump
4 circuit or in this case the Buti pump circuit?

5 A. I'm sorry. In this case the Buti
6 Figure 3A charge pump.

7 Q. Okay. So your point being in your
8 opinion that multiple combinations of the
9 transistors 60, 54, 48, 42 are active at one time as
10 opposed to what your opinion of the '241 patent is
11 that each of the transistors would have to be
12 exclusively selected in order to meet the claim
13 limitation. Is that a fair summary of your opinion,
14 at least in part?

15 A. In part that multiple of these
16 transistors of Buti's Figure 3A are enabled and
17 they're really achieving the purpose of bleeding off
18 current or charge.

19 Q. And these transistors shown in Buti's
20 Figure 3A, those are turned on or off by the
21 inverters and the diodes, correct, shown in
22 Figure 3A?

1 A. That's right. That there's a signaling
2 that comes down -- or there's a signal between 46,
3 52, 58 and 64 and that's fed through these inverters
4 of Figure 3A to the gates of these transistors to
5 either enable them and so forth.

6 Q. And just so the record's clear, the
7 inverters we're referring to in Figure 3A of Buti is
8 inverters 44, 50, 56, 62, correct?

9 A. That's correct.

10 Q. And the diodes are referenced in Buti's
11 Figure 3A as 46, 52, 58 and 64, correct?

12 A. That's correct.

13 Q. So I understand your point about you say
14 that multiples of these have to be selected at one
15 time, but nevertheless, you would -- you don't
16 disagree that the total load coupled to the output
17 of the charge pump shown here in Figure 3A of Buti
18 can be adjusted, correct?

19 MR. PETRSORIC: Objection, form.

20 A. I would say that -- give me one second.

21 BY MR. RIFFE:

22 Q. Uh-huh.

1 (Witness reviews document.)

2 A. That these transistors are turned on and
3 off to adjust this bleed path current for the
4 varying magnitudes of the charge pump it looks like.
5 I'm reading from paragraph 59 of my declaration.
6 And depending on which pathways are enabled, it
7 changes the operating characteristics of this
8 embodiment in Figure 3A.

9 BY MR. RIFFE:

10 Q. And per your testimony, those transistors
11 are turned on and off to adjust the bleed path
12 current as you summarize I guess in paragraph 59
13 that results in varying magnitudes of the charge
14 pump output voltage V out shown in Figure 3A of
15 Buti, correct?

16 A. It's -- I'll direct us to paragraph 61
17 where the pathway we've been talking about, the ramp
18 rate control circuit doesn't regulate the value of
19 V out in 3B, but the ramp rate control circuit
20 regulates the rate of increase of this V out when
21 the charge pump is -- when Buti's charge pump is
22 turned on.

1 Q. So in your opinion, regulating the rate
2 of increase of V out is different than regulating
3 the value of V out; is that correct?

4 A. Yes, changing the rate at which something
5 increases or decreases is not changing the ultimate
6 value of that.

7 Q. Well, if something -- if you're
8 regulating the rate of increase of V out, how does
9 that not ultimately result in an increase of the
10 overall value of V out?

11 MR. PETRSORIC: Objection, form.

12 A. V out is -- if your V out is, for
13 example, 5 volts, then it's just 5 volts. If it
14 takes two seconds or two microseconds to reach that
15 value from, let's say, zero volts, one is the value
16 of V out and one is the rate at which you either
17 approach it or -- approach the value in terms of
18 ramping up, for example.

19 BY MR. RIFFE:

20 Q. And so in your opinion with respect to
21 the circuit of Buti's Figure 3A, the combination of
22 those transistors, inverters, diodes, for example,

1 in the bleeder circuit have no effect on the overall
2 value of V out that is generated by the charge pump,
3 is that correct, regardless of the combination of
4 transistors that may be selected?

5 A. That's generally what I'm getting at in
6 paragraph 60 and 61, that the ramp rate control
7 circuit doesn't regulate the value of V out, it's
8 changing in this case the rate of increase of V out
9 depending on how current is bleeding through these
10 pathways.

11 Q. So do you view the combination of the
12 transistors within Buti's bleeder circuit shown in
13 Figure 3A as loads on the circuit?

14 A. I don't believe that I've referred to
15 them -- I know that -- I believe Dr. Dickens refers
16 to them as loads in his report. I don't believe I
17 refer to them as that, but rather pathways through
18 the bleeder of Buti that are changing the rate of
19 ramp of a voltage level.

20 Q. And even in view of that -- even in view
21 of the fact that they're used -- they're transistors
22 that are used in that bleeder circuit which we have

1 established transistors are -- can be loads, if you
2 will, in view of the '241 patent, you disagree with
3 Dr. Dickens that the combination of these
4 transistors being turned on or off are loads which
5 can be used to change the V out of Buti's charge
6 pump voltage; is that correct?

7 MR. PETRSORIC: Objection, form.

8 A. I would say, as I recall, in looking
9 through my declaration right now, these are
10 transistors for current pathways to control the
11 behavior of the bleeder circuit and the rate at
12 which value -- the rate at which the circuit
13 regulates the rate of increase of V out.

14 BY MR. RIFFE:

15 Q. Do you agree that the transistors of the
16 Buti Figure 3A reference 60, 54, 48 and 42 operate
17 in the same way as the transistors disclosed, for
18 example, in Figures 5A and 5B of the '241 patent?

19 A. Your question one more time.

20 Q. Do you agree that the transistors of Buti
21 Figure 3A, which are reference numerals 60, 54, 48
22 and 42, operate in the same way as the transistors

1 disclosed, for example, in Figures 5A and 5B of the
2 '241 patent?

3 A. I would say that Figures 5A and 5B of the
4 '241 show a transistor in those figures. As to
5 whether they're performing the same functions, Buti
6 visualizes a transistor as well. Buti, again, is
7 using these to change the rate of increase of the
8 V out value in Buti's Figure 3A.

9 Q. And how are the transistors being used in
10 Figures 5A and 5B of the '241 patent?

11 A. It looks like for Figure 5A it's being
12 described at line 23 of column 5 that there's the
13 EN_A switch and the load A are shown. In this
14 embodiment switch EN_A is an NMOS transistor whose
15 gate is connected to EN_A terminal and whose source
16 is connected to electrical ground, and whose drain
17 is connected to the load capacitor. So it looks
18 like these are being used to connect a various load
19 A to the V outline as we discussed earlier today,
20 whereas in Buti the transistors 60, 54, 48 and 42
21 are enabling current flow paths to change the rate
22 of increase of this V outline.

1 Q. And you would agree that the transistors
2 in Buti Figure 3A and the transistors, for example,
3 in Figures 5A and 5B of the '241 patent are acting
4 as switches, correct?

5 A. That they can be switched to either --
6 effectively on or off in both cases. I think they
7 say they're both NMOS as well.

8 Q. Looking again either at the Buti
9 reference by itself or in combination -- I guess
10 look at it in combination with Doluca and
11 specifically going back to your paragraph 71. Here
12 you again noted that the inverter, buffer
13 comparators are not operated exclusively to the
14 other inverter, buffer comparators, meaning that
15 multiple loads can be coupled to the output of
16 Doluca's pump circuit at the time depending on the
17 diode stack, right?

18 A. Yes.

19 Q. How do you square that, if you will, with
20 the discussion in the '241 patent that we discussed
21 earlier today, and you can reference either Figure 3
22 or Figure 7, where the patent discloses that

1 additional loads can be added to the circuit in
2 cases where, for example, the V_{cfa} or V_{cfrb} in
3 certain circumstances relative to the V_{ref} are
4 either higher or lower and therefore loads can be
5 added or subtracted from the circuit?

6 MR. PETRSORIC: Objection, form.

7 A. So generally that language talking about
8 the block S was to check the various thresholds and
9 adjust the load as we talked about in Figure 10.
10 Whereas the loads A, B and C in the figures of the
11 patent are just as the claim says. For instance, in
12 claim 1 at 22: A plurality of loads selectively
13 coupleable to an output of a pumping circuit, each
14 load associated with a specific pump voltage, et
15 cetera.

16 BY MR. RIFFE:

17 Q. So do you view load S of Figure 7, for
18 example, as one of those claimed loads that can be
19 selectively coupled to the circuit?

20 A. I don't recall discussing the load S in
21 that context in my declaration.

22 Q. Sitting here today, do you have an

1 opinion regarding the load S and whether that is one
2 of the plurality load -- of loads selectively
3 coupleable to an output of a pumping circuit?

4 A. As I recall, for those plurality of
5 loads, I referred to the load A or load B or load C
6 of, for example, Figure 7 of the patent.

7 Q. And why are you differentiating between
8 loads A, B and C versus load S in that respect?

9 A. Well, just as the way that they're
10 described in the specification versus where we were
11 earlier today and how the block labeled load S can
12 be used to make these small adjustments in the
13 context of the flow diagram in Figure 10.

14 Q. Is it your opinion that load S is not
15 associated with a specific pump voltage?

16 A. That load S is not -- at least I don't
17 talk about it in my declaration. Load S is -- I
18 keep losing my place. That I don't discuss in my
19 declaration load S being one of the claim 1
20 plurality of loads selectively coupleable that meets
21 the limitation of claim 1.

22 Q. And why does that not meet the limitation

1 of claim 1 sitting here today, in your opinion?

2 A. What I was saying was I haven't discussed
3 the load S block in that context in my declaration.

4 Q. Do you have an opinion sitting here right
5 now whether load S is one of the plurality of loads
6 selectively coupleable to an output of a pumping
7 circuit and that load being associated with a
8 specific pump voltage? Do you have an opinion one
9 way or the other?

10 A. I haven't offered that opinion in my
11 declaration.

12 Q. You would agree with me, however, that
13 when load S is selected, in other words, when the
14 V_{cfra} is less than V_{ref} , that you have -- you have
15 the possibility of having multiple loads connected
16 to the output of the pumping circuit shown in
17 Figure 7, for example, correct?

18 A. That in the context of Figure 7 there
19 would be, for example, one of load A or load B or
20 load C connected. In addition the load S may be
21 enabled as part of the flow diagram in Figure 10.

22 Q. And therefore those loads are not

1 operated exclusively to each other in that
2 condition, correct?

3 MR. PETRSORIC: Objection, form.

4 A. I would say I -- in terms of the loads
5 operated exclusively, I have not incorporated load S
6 in that setting in my declaration.

7 BY MR. RIFFE:

8 Q. Sitting here today, do you have an
9 opinion as to whether or not when load S is
10 activated along with one of loads A, B or C, that
11 those loads are not operated exclusively to each
12 other, correct?

13 A. I don't think I've talked about that in
14 my declaration.

15 Q. So sitting here today, you have no
16 opinion as to whether or not when load S is
17 activated along with one of loads A, B or C, that
18 those loads are not operated exclusively to each
19 other?

20 A. I guess I would just say if load A of
21 Figure 7 is connected as one of load A or load B or
22 load C and load S is connected as we discussed in

1 Figure 10, then those would both be connected.

2 Q. And under your understanding of what the
3 claim phrase "load selector" means, then that
4 condition, given they would both be connected, that
5 condition would not fall within the scope of claim 1
6 of the '241 patent, correct?

7 MR. PETRSORIC: Objection, form.

8 A. I don't recall talking about the load S
9 block of Figure 7 in connection with claim 1 in my
10 declaration.

11 BY MR. RIFFE:

12 Q. It's your understanding, load selector
13 means that the loads have to be exclusively
14 selected. So when load S and one -- one of loads A,
15 B or C are selected in the embodiment of Figure 7,
16 for example, of the '241 patent, it would be your
17 opinion that that implementation would not be
18 covered by claim 1 of the '241 patent, correct?

19 MR. PETRSORIC: Objection to form.

20 A. That I have pointed to -- in claim 1,
21 element B, that the plurality of loads selectively
22 coupleable to an output of a pumping circuit are the

1 load A or load B or load C of the figures we've
2 discussed.

3 BY MR. RIFFE:

4 Q. Dr. Brogioli, do you plan to testify at
5 the oral hearing in this IPR proceeding?

6 A. I don't know that I've discussed that
7 with counsel one way or the other.

8 Q. Is there anything you were prepared to
9 talk about today that we haven't talked about?

10 A. No, not that I can think of.

11 MR. RIFFE: No further questions at
12 this time.

13 MR. PETRSORIC: Take a five-minute
14 break.

15 MR. RIFFE: Off the record.

16 (Recess taken from 2:36 p.m. to
17 2:40 p.m.)

18 MR. PETRSORIC: I have no questions.

19 MR. RIFFE: No questions.

20 (Deposition concluded at 2:40 p.m.)
21
22

1 REPORTER'S CERTIFICATION

2 I, Micheal A. Johnson, Registered Diplomat
3 Reporter and Notary Public within and for the State
4 of Texas do hereby certify:

5 That MICHAEL C. BROGIOLI, Ph.D., the witness
6 whose deposition is hereinbefore set forth, was duly
7 sworn by me before the commencement of such
8 deposition and that such deposition was taken before
9 me and is a true record of the testimony given by
10 such witness.

11 I further certify that the adverse party,
12 Sonrai Memory Limited, was represented by counsel at
13 the deposition.

14 I further certify that the deposition of
15 MICHAEL C. BROGIOLI, Ph.D. occurred at the offices
16 of Fish & Richardson, P.C., 111 Congress Avenue,
17 Suite 2000 on Wednesday, June 5, 2024, commencing at
18 9:06 a.m. to 2:40 p.m..

19 I further certify that I am not related to
20 any of the parties to this action by blood or
21 marriage, I am not employed by or an attorney to any
22 of the parties to this action, and that I am in no

1 way interested, financially or otherwise, in the
2 outcome of this matter.

3 IN WITNESS WHEREOF, I have hereunto set my
4 hand this 11th day of June, 2024.

5

6



7

8

MICHEAL A. JOHNSON, RDR, CRR

9

My commission expires: 8/8/2024

10

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