

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

- - - - - x

VIZIO, INC., :

Petitioner, : Case No. IPR2024-00073

v. : U.S. Patent No.

POLARIS POWERLED : 7,843,148

TECHNOLOGIES, LLC, :

Patent Owner. :

- - - - - X

Videotaped Deposition of REGAN A. ZANE, Ph.D.

Conducted Virtually

Tuesday, May 14, 2024

11:09 a.m. EDT

Job No.: 537008

Pages 1 - 132

Reported by: Debra A. Whitehead

1 Videotaped Deposition of REGAN A. ZANE, Ph.D.,
2 conducted virtually.

3
4
5 Pursuant to notice, before Debra Ann Whitehead,
6 E-Notary Public in and for the State of Maryland.

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C O N T E N T S

EXAMINATION OF REGAN A. ZANE, Ph.D.	PAGE
By Mr. Bemben	8

EXHIBITS MARKED IN TODAY'S SESSION

(None Marked)

EXHIBITS MARKED IN PRIOR SESSIONS

(Not Attached)

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Exhibit 1001 U.S. Patent No. 7,843,148	15
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Transcript of Regan A. Zane, Ph.D.
Conducted on May 14, 2024

6

1	P R O C E E D I N G S	11:08:31
2	VIDEO SPECIALIST: Here begins Media	11:08:31
3	Number 1 in the videotaped deposition of Regan A.	11:08:42
4	Zane, Ph.D., in the matter of Vizio, Inc., V	11:08:46
5	Polaris PowerLED Technologies, LLC; in the United	11:08:49
6	States Patent and Trademark Office, before the	11:08:53
7	Patent Trial and Appeal Board; Case Number	11:08:54
8	IPR2024-00073.	11:08:58
9	Today's date is May 14, 2024. The time	11:09:00
10	on the video monitor is 11:09 a.m. eastern time.	11:09:03
11	The remote videographer today is Kelli Welch,	11:09:07
12	representing Planet Depos. All parties of this	11:09:11
13	video deposition are attending remotely.	11:09:14
14	Would counsel please voice-identify	11:09:16
15	themselves and state whom they represent.	11:09:20
16	MS. SWAROOP: Good morning. This is	11:09:20
17	Sheila Swaroop; Knobbe, Martens, Olson & Bear, for	11:09:22
18	Petitioner Vizio and the witness. Also attending	11:09:24
19	for petitioner is Daniel Kiang.	11:09:27
20	MR. BEMBEN: This is Richard Bemben from	11:09:32
21	Sterne, Kessler, Goldstein & Fox, on behalf of the	11:09:36
22	patent owner. And also attending is Aidan	11:09:39

Transcript of Regan A. Zane, Ph.D.
Conducted on May 14, 2024

7

1 Brewster, Jason Fitzsimmons, and Jennifer Chagnon.

11:09:43

2 VIDEO SPECIALIST: The court reporter
3 today is Debbie Whitehead, representing Planet
4 Depos.

11:09:48

11:09:48

11:09:48

5 The witness will now be sworn.

11:09:57

6 REGAN A. ZANE, Ph.D.,

11:09:57

7 having been duly sworn, testified as follows:

11:10:06

8 MS. SWAROOP: And, Counsel, before we get
9 started, I just wanted to state on the record a
10 couple of things that I informed you before we
11 started.

11:10:06

11:10:08

11:10:10

11:10:11

12 The first is, consistent with our prior
13 correspondence about the deposition, Dr. Zane does
14 have with him clean hard and electronic copies of
15 his declaration, the exhibits cited in his
16 declaration. He also has a copy of the petition,
17 the institution decision, and the Markman ruling
18 from the District Court that was issued on May 8.

11:10:13

11:10:14

11:10:16

11:10:21

11:10:25

11:10:29

11:10:32

19 We also informed you prior to the
20 deposition that Dr. Zane had identified two
21 typographical errors in his report that he would
22 like to correct. He has a file containing those

11:10:37

11:10:38

11:10:41

11:10:44

1 two typographical errors which we also sent to you
2 electronically.

11:10:48

11:10:51

3 EXAMINATION BY COUNSEL FOR PATENT OWNER
4 BY MR. BEMBEN:

11:10:54

11:10:54

5 Q Dr. Zane, please state your full name,
6 for the record.

11:10:55

11:10:57

7 A Regan Andrew Zane.

11:10:58

8 Q Good morning, Dr. Zane. Do you
9 understand that you are under oath today?

11:10:59

11:11:03

10 A Yes.

11:11:06

11 Q Are you on any medication that would
12 impair your ability to give truthful testimony
13 today?

11:11:06

11:11:10

11:11:12

14 A No.

11:11:14

15 Q Is there any reason that you cannot give
16 truthful testimony today?

11:11:14

11:11:17

17 A None that I am aware of.

11:11:19

18 Q Have you been deposed before?

11:11:20

19 A Yes.

11:11:25

20 Q Approximately how many times?

11:11:25

21 A I don't recall. Certainly more than 20,
22 probably more than 30.

11:11:31

11:11:33

Transcript of Regan A. Zane, Ph.D.
Conducted on May 14, 2024

9

1	Q	When was the last time that you were	11:11:35
2		deposed?	11:11:38
3	A	A few weeks ago.	11:11:41
4	Q	So you're familiar with the process, but	11:11:43
5		let's just go over some of the ground rules.	11:11:47
6		I ask that you please provide verbal	11:11:50
7		answers today so that the court reporter can	11:11:52
8		transcribe our conversation.	11:11:53
9		Is that okay?	11:11:55
10	A	Yes.	11:11:56
11	Q	Let's try not to speak over each other.	11:11:57
12		We're in a remote environment, I know that can be	11:12:01
13		difficult at times. But I'll certainly allow you	11:12:03
14		to answer your questions.	11:12:06
15		I'm here to ask the questions today, and	11:12:09
16		you're here to answer them.	11:12:11
17		You understand that. Correct?	11:12:12
18	A	Yes.	11:12:15
19	Q	If I ask a question and you answer it, I	11:12:15
20		will assume that you've understood the question.	11:12:19
21		Is that fair?	11:12:21
22	A	Yes.	11:12:23

1 Q I'll try to take a break every hour or 11:12:23
2 so. But if you need a break for any reason, just 11:12:27
3 let me know. All that I ask is that you finish up 11:12:29
4 with the line of questioning that we're going 11:12:32
5 through or the question that we're on. 11:12:34

6 Is that okay? 11:12:36

7 A Yes, I appreciate that. 11:12:37

8 Q And I will introduce the declaration now 11:12:39
9 so that if you need to consult it at any time 11:12:45
10 during today's deposition, you can. 11:12:47

11 And kind of along those lines, if I'm 11:12:50
12 asking you questions and you believe that you need 11:12:52
13 to consult another document that is in the record 11:12:54
14 but that I have not provided yet in the 11:12:57
15 deposition, just ask and I'll introduce it. Okay? 11:12:59

16 A Yes. 11:13:03

17 Q Okay. So with that, I understand from 11:13:03
18 your counsel that you have a clean copy of what 11:13:06
19 has been previously marked as Exhibit 1003. The 11:13:10
20 title is Declaration of Regan Zane, Ph.D., in 11:13:15
21 Support of Petition for Inter Partes Review of 11:13:18
22 U.S. Patent Number 7,843,148. 11:13:21

1	Do you have a copy of that document?	11:13:26
2	A Yes, I do.	11:13:28
3	(Vizio Exhibit 1003, previously marked,	11:13:29
4	not attached.)	11:13:29
5	Q Do you need us to provide one in the chat	11:13:29
6	box, or are you all set?	11:13:31
7	A I am all set.	11:13:35
8	Q Okay. So your counsel has already	11:13:35
9	confirmed that it's a full copy, and that it's a	11:13:41
10	clean copy.	11:13:43
11	Can you turn to Page -- the last page,	11:13:44
12	which is Page 130, of your declaration.	11:13:47
13	A I am there.	11:13:52
14	Q And I just want to confirm that that is	11:13:52
15	your signature on Page 130?	11:13:55
16	A That is correct.	11:13:58
17	Q Did you prepare this declaration, Exhibit	11:13:59
18	1003?	11:14:03
19	A Yes, I did.	11:14:05
20	Q What was your process for preparing the	11:14:05
21	declaration?	11:14:08
22	MS. SWAROOP: And, Dr. Zane, you can	11:14:10

1 answer the question. I would just caution you not
2 to reveal any privileged communications in your
3 response.

4 A My process in developing this declaration
5 was similar to what I used in past declarations as
6 well as past reports. The process was that I come
7 to understand the materials, come to review
8 appropriate materials that in this case are all
9 cited and referenced within the report, I come to
10 develop my opinions. I've worked together with
11 counsel in support, as I described my findings,
12 helped describe my opinions and my inputs.

13 And then I've developed the report based
14 on those findings, those opinions, and the
15 approach that I pursued and preferred to convey
16 those opinions throughout the report.

17 Q Do you recall how long you spent
18 preparing the declaration?

19 A I don't recall for sure, but I believe it
20 was around 25 to 30 hours.

21 Q Did you write the declaration?

22 A Yes, I developed the declaration

1 following the process that I just described. That
2 included, again, my development of my opinions, my
3 conveying of the approach that I wanted to take to
4 convey those opinions, my working together with
5 counsel in support of developing aspects of this
6 report to best convey those opinions of mine, and
7 then, you know, final editing and review to ensure
8 that this report conveyed all of my opinions as I
9 found appropriate.

11:15:31
11:15:34
11:15:38
11:15:41
11:15:44
11:15:48
11:15:51
11:15:54
11:15:57

10 Q And your counsel today mentioned that
11 there were two typographical errors that you
12 wanted to correct.

11:15:58
11:16:02
11:16:04

13 Is that right?

11:16:05

14 A That is correct.

11:16:07

15 Q Please go ahead. Let me know what the
16 first error is.

11:16:07
11:16:13

17 A Just to be sure I get these right, I'm
18 referring to a piece of paper that has these two
19 clerical errors. I believe you have a copy of
20 this.

11:16:19
11:16:21
11:16:23
11:16:25

21 The first is on Paragraph 44. And I'm
22 just going to go there just to double-check I've

11:16:26
11:16:34

1 got this right. So Paragraph 44 is on Page 25 and
2 Page 26.

3 And in the -- on Page 25, in Paragraph
4 44, about midway down there's a reference that I
5 make to activation switch, parentheses, 5 through
6 7. This should read activation switch,
7 parentheses, 5 dash 8, close parentheses.

8 Q Understood. And the second?

9 A Paragraph 201, which is on Page 128 and
10 129. At the top of Page 129 in Paragraph 201, I
11 have an acronym that's listed in the declaration,
12 it's the first word in that page, that says, SBPT.
13 That should read SPDT as it is used throughout the
14 other paragraphs around it.

15 Q Thank you, Dr Zane.

16 Are there any other typographical errors
17 that you noticed in your declaration that you want
18 to correct at this time?

19 A No, there are not. If I recognize
20 anything during this deposition, I'll be sure to
21 bring it up.

22 Q And, of course, you understand you're

11:16:36

11:16:43

11:16:49

11:16:55

11:16:58

11:17:01

11:17:05

11:17:15

11:17:21

11:17:38

11:17:47

11:17:51

11:17:58

11:18:06

11:18:24

11:18:27

11:18:30

11:18:31

11:18:32

11:18:34

11:18:36

11:18:41

1	here today to be deposed in an inter partes review	11:18:43
2	proceeding that is before the U.S. Patent Trial	11:18:46
3	and Appeal Board?	11:18:48
4	A Yes.	11:18:50
5	Q And the patent at issue today is U.S.	11:18:50
6	Patent Number 7,843,148. Correct?	11:18:53
7	A Correct.	11:18:58
8	Q And again, just so you have a copy of it	11:18:59
9	in front of you, you can reference it when you	11:19:06
10	need to, please go ahead and take out your clean	11:19:07
11	copy of Exhibit 1001.	11:19:10
12	MR. BEMBEN: I'd like to introduce that	11:19:13
13	now.	11:19:14
14	(Vizio Exhibit 1001, previously marked,	11:19:16
15	not attached.)	11:19:16
16	Q That is U.S. Patent 7,843,148.	11:19:16
17	Let me know when you have it.	11:19:22
18	A I have it.	11:19:24
19	Q And again, you have a clean copy, a clean	11:19:25
20	hard copy. Correct?	11:19:30
21	A That is correct.	11:19:32
22	Q And you have read the '148 patent.	11:19:32

1	Right?	11:19:36
2	A That is correct.	11:19:44
3	Q You understand the '148 patent?	11:19:44
4	A I believe I do.	11:19:46
5	Q Is it okay if I refer to Exhibit 1001 as	11:19:46
6	"the '148 patent"?	11:19:49
7	A Yes.	11:19:55
8	Q And in your analysis of the '148 patent,	11:19:55
9	did you read all of the claims?	11:19:57
10	A Yes.	11:20:05
11	Q That would be Claims 1 through 22.	11:20:06
12	Correct?	11:20:10
13	A That is correct. And I'm sure at	11:20:12
14	appropriate points in my review I've read the	11:20:15
15	claims.	11:20:18
16	Q Did you understand all the claims of the	11:20:19
17	'148 patent?	11:20:21
18	A Yes. And to be sure, I'm not sure what	11:20:31
19	additional may be read into "understand." But,	11:20:34
20	yes, it is my understanding that I've read through	11:20:38
21	these claims and reviewed the patent, the '148	11:20:41
22	patent, and I believe I understand what is listed	11:20:44

1 in these claims.

11:20:48

2 Q And in your declaration I believe that
3 you addressed claim construction.

11:20:56

11:21:02

4 Are you familiar with the process of
5 claim construction, Dr. Zane?

11:21:03

11:21:04

6 A Yes, I am.

11:21:09

7 Q And I'll direct you to the section where
8 you describe that is in Paragraphs 29 and 30.

11:21:09

11:21:11

9 And my question for is you simple, just
10 it does not appear that you expressly construed
11 any claim terms of the '148 patent in your
12 declaration.

11:21:17

11:21:19

11:21:21

11:21:24

13 Is that correct?

11:21:26

14 A As I -- as I believe I've stated here in
15 my -- in my declaration, I've applied as
16 appropriate plain and ordinary meaning to the best
17 of my understanding throughout my analysis of the
18 '148 patent regarding the claim terms within the
19 patent.

11:21:31

11:21:33

11:21:40

11:21:42

11:21:46

11:21:51

20 Q And so other than applying the plain and
21 ordinary meaning, you didn't expressly construe
22 any claim terms that's in the '148 patent.

11:21:53

11:21:56

11:21:59

1	Correct?	11:22:03
2	A I believe that is correct.	11:22:03
3	Q So, Dr. Zane, how did you come to be	11:22:06
4	involved in this IPR? IPR is inter partes review.	11:22:10
5	Is it okay if I refer to it as IPR?	11:22:14
6	A Yes.	11:22:17
7	MS. SWAROOP: And, Dr. Zane, again, just	11:22:18
8	the cautionary instruction regarding privilege.	11:22:20
9	If you can answer that question without	11:22:25
10	disclosing communications with counsel, you can	11:22:27
11	answer.	11:22:30
12	A And just to clarify, I think there were	11:22:35
13	two questions. One was can we refer to this as	11:22:37
14	IPR, and that is yes. And the other, if I recall	11:22:39
15	the question correctly, is how did I become	11:22:43
16	involved in this IPR proceeding. And --	11:22:46
17	Q Let me just ask my question again.	11:22:51
18	So, Dr. Zane, how did you become involved	11:22:52
19	in this IPR proceeding?	11:22:54
20	MS. SWAROOP: And again, Dr. Zane, same	11:22:56
21	cautionary instruction with regard to privilege.	11:22:58
22	Answer that to the extent you can without	11:23:01

1 disclosing any privileged communications.

11:23:03

2 A I don't recall all the details. But
3 similar to my involvement in other similar
4 proceedings, I believe that I was contacted, I was
5 provided information about the case, and I
6 considered if I had availability as well as
7 technical background appropriate, as well as
8 interest in participating in the case.

11:23:05

11:23:09

11:23:12

11:23:20

11:23:22

11:23:25

11:23:29

9 And then I -- and then I became -- you
10 know, I made the decision and agreed to work with
11 counsel for Vizio in this case.

11:23:31

11:23:36

11:23:39

12 Q Did you work with an expert consulting
13 agency?

11:23:43

11:23:46

14 A I do not.

11:23:47

15 Q So you were directed -- I'm sorry, you
16 were contacted directly by counsel in this
17 proceeding.

11:23:47

11:23:50

11:23:53

18 Is that correct?

11:23:53

19 A That's my recollection.

11:23:54

20 Q Do you recall approximately when you were
21 contacted?

11:23:55

11:23:59

22 A I do not recall. It was last year,

11:24:02

1 probably mid last year, but I don't recall.

11:24:09

2 Q Are you involved in the underlying
3 district court litigation as well?

11:24:14

11:24:17

4 MS. SWAROOP: Object as outside the
5 scope.

11:24:22

11:24:25

6 A I have been contacted with regard to the
7 underlying district case in the litigation related
8 to this patent. I have had very little
9 involvement in that case.

11:24:28

11:24:32

11:24:36

11:24:39

10 Q And do you know why you were selected to
11 participate in this IPR?

11:24:42

11:24:45

12 MS. SWAROOP: Objection. Form.

11:24:48

13 A I do not.

11:24:49

14 Q Let's talk a little bit about today's
15 deposition.

11:24:50

11:24:54

16 Did you prepare for this deposition?

11:24:55

17 A Yes, I did.

11:25:00

18 Q What did you do?

11:25:00

19 A Similar to how I've approached similar
20 depositions in related -- in similar situations,
21 I've reviewed the materials that are associated
22 with my declaration. In this case that included

11:25:05

11:25:07

11:25:12

11:25:15

1 the reviewing of my declaration itself, as well as 11:25:20
2 many of the materials that I referred to in the 11:25:23
3 declaration. Certainly including the primary and 11:25:24
4 secondary prior art that I have referenced in my 11:25:28
5 declaration, as well as spending some time with 11:25:31
6 counsel for Vizio just discussing my review of 11:25:35
7 these materials. 11:25:40

8 Q How long did you meet with counsel? 11:25:45

9 A Approximately one day, as I understand 11:25:52
10 it. 11:25:54

11 Q And you mentioned that you met with 11:25:58
12 counsel for Vizio. 11:25:59

13 Did you meet with anyone else? 11:26:00

14 A No, I don't believe so. 11:26:05

15 Q And you mentioned some materials that you 11:26:07
16 reviewed, but I don't think you mentioned the 11:26:12
17 court's institution decision. 11:26:16

18 Did you review that? 11:26:19

19 A Yes, I did review that. Counsel provided 11:26:20
20 that to me during our time together, and I did 11:26:22
21 review it. 11:26:28

22 Q Was there anything else that you didn't 11:26:29

1 mention now that you reviewed in preparation for
2 the deposition today?

3 A As best as I recall, the only material
4 that I've reviewed that was not referred to as --
5 and cited as materials considered in my
6 declaration is the decision on the claim
7 construction that we just mentioned.

8 Q And as we know, today's deposition is
9 being conducted remotely. Can you tell me where
10 you are right now?

11 A I am at the offices for Knobbe.

12 Q Where physically is that located?

13 A In California, near the John Wayne
14 Airport.

15 Q And can you describe your setup where you
16 are right now?

17 What do you have in front of you? You
18 know, are you in an office? Just general.

19 A Yes, I'm in a small conference room. I
20 have a setup here with the computer. I have the
21 materials we just described as hard copies sitting
22 next to me. I actually have Sheila Swaroop

1 sitting next to me at her computer as well. We 11:27:44
2 are sharing the same microphone. And as you can 11:27:46
3 see, we have separate video. 11:27:49

4 Q Okay. Thank you, Dr. Zane. 11:27:50

5 Let's turn to your declaration. And 11:28:00
6 let's just take a look at the table of contents. 11:28:02
7 Let's start there. 11:28:04

8 And if you go to Section 7 in the table 11:28:06
9 of contents, it is overview Of the Prior Art. 11:28:10

10 Do you see that? 11:28:15

11 A Yes, I do. 11:28:16

12 Q And there are six references that are 11:28:17
13 listed, Thomas, Exhibit 1005; Zane, 1006; 11:28:21
14 Tatewaki, 1007; applicant submitted prior art, 11:28:28
15 Exhibit 1001; a book by Horowitz and Hill, Exhibit 11:28:33
16 1008; and Morris, Exhibit 1011. 11:28:37

17 Do you see that? 11:28:40

18 A Yes, I do. 11:28:42

19 Q And the references that you list in the 11:28:43
20 Overview of the Prior Art in Section 7 of your 11:28:47
21 declaration, you use in the grounds of 11:28:52
22 unpatentability, which are throughout the 11:28:53

1	remainder of your declaration.	11:28:58
2	Is that correct?	11:28:59
3	A That is correct.	11:29:02
4	Q Did you identify the references that you	11:29:03
5	used in the grounds of unpatentability in your	11:29:10
6	declaration?	11:29:14
7	A Could you clarify the question?	11:29:16
8	Q Did you find the references that you	11:29:18
9	ultimately used in the grounds of unpatentability	11:29:24
10	in your declaration?	11:29:27
11	A I don't recall the full process. I did	11:29:29
12	do -- I did support some of the early search for	11:29:31
13	potential prior art. And I was also provided a	11:29:36
14	list of prior art to consider and evaluate, and	11:29:42
15	whether that would be appropriate prior art for	11:29:44
16	this case.	11:29:46
17	The references, at least Thomas,	11:29:48
18	Tatewaki, were among those that were provided to	11:29:54
19	me. And I don't recall for sure on the Art of	11:30:01
20	Electronics and the Digital Circuits and Systems.	11:30:04
21	These are certainly references I've used in the	11:30:08
22	past. I don't recall in this case if I suggested	11:30:10

1	them or if they were -- if they were provided to	11:30:11
2	me and I was asked to opine on them.	11:30:13
3	Q How about Exhibit 1006; did you identify	11:30:19
4	that reference?	11:30:26
5	A I did. And I don't recall if counsel had	11:30:27
6	that on their list at the time as well.	11:30:31
7	Q This list that counsel provided to you,	11:30:35
8	do you recall how many references were identified	11:30:38
9	on that list?	11:30:40
10	A I do not.	11:30:42
11	Q Was it -- can you ballpark it?	11:30:44
12	MS. SWAROOP: Object to form, and also	11:30:49
13	again just caution in terms of cautionary	11:30:51
14	instruction on privilege.	11:30:54
15	You can answer the question subject to	11:30:55
16	the objection.	11:30:57
17	A I don't recall. It was more than the	11:30:59
18	list that I have here.	11:31:00
19	Q Was it more than ten?	11:31:04
20	A I don't recall. It was likely in that --	11:31:09
21	in that range.	11:31:11
22	Q And you mentioned that you conducted a	11:31:15

1	prior art search.	11:31:16
2	Is that correct?	11:31:17
3	A I did some review.	11:31:20
4	Q What do you mean that you "did some	11:31:24
5	review"?	11:31:26
6	A I mean that I did do some review,	11:31:27
7	particularly looking at my background and the work	11:31:30
8	that I've done in this area, and just recalling	11:31:32
9	some of the activities at the time of that in this	11:31:36
10	space.	11:31:40
11	And so I did do some search, but it was	11:31:42
12	probably limited in scope.	11:31:47
13	Q And so you did some searching on your own	11:31:48
14	that was limited in scope, and you were provided	11:31:53
15	with a list of references from counsel.	11:31:55
16	How did you ultimately select the	11:31:59
17	references that were used in the grounds of	11:32:00
18	unpatentability in your declaration?	11:32:03
19	MS. SWAROOP: And again same cautionary	11:32:07
20	instruction with regard to privilege, Dr. Zane.	11:32:08
21	But you can answer subject to that objection.	11:32:11
22	A The references that were finally included	11:32:13

1 here were based on, you know, discussion and a 11:32:16
2 collaborative discussion between myself and 11:32:22
3 counsel, as I recall. 11:32:24

4 Q All right. Let's turn to Paragraph 18 of 11:32:25
5 your declaration, and that's on Page 8. 11:32:33

6 A I am there. 11:32:48

7 Q So below Paragraph 18 you have a table 11:32:49
8 that lists the materials that you considered in 11:32:54
9 formulating the opinions in your declaration. 11:32:57

10 Correct? 11:32:59

11 A That is correct. I list the table here, 11:33:02
12 and then as I also stated, I believe in Paragraph 11:33:05
13 19, any additional documents that I've cited 11:33:08
14 specifically in my declaration that were also 11:33:12
15 considered, to the extent they're not listed in 11:33:14
16 this table. 11:33:17

17 Q And just to clarify, I don't recall 11:33:17
18 seeing additional references that were cited in 11:33:20
19 your declaration that aren't in the table. 11:33:22

20 Are you aware of any at this moment? 11:33:27

21 A I am not aware of any at this moment. It 11:33:29
22 was my intention to include them all in this 11:33:32

1	table.	11:33:33
2	Q Let's take a look at Exhibit 1012, which	11:33:34
3	you reviewed.	11:33:42
4	MR. BEMBEN: Can I introduce Exhibit 1012	11:33:48
5	that is U.K. patent application GB 2459009A.	11:33:50
6	(Vizio Exhibit 1012, previously marked,	11:33:57
7	not attached.)	11:33:59
8	Q Do you have a copy of that, Dr. Zane?	11:33:59
9	A I believe so. Do you know again what	11:34:07
10	exhibit number that was in the --	11:34:08
11	Q That's Exhibit 1012 in our proceeding	11:34:10
12	here.	11:34:13
13	A I do have a copy of that.	11:34:20
14	Q And just to confirm, it's a clean hard	11:34:21
15	copy.	11:34:24
16	Is that right?	11:34:24
17	A That is correct.	11:34:30
18	Q And just let me know when you're ready to	11:34:30
19	answer questions.	11:34:41
20	A I am ready.	11:34:55
21	Q Can you please turn to Page 19 of Exhibit	11:34:57
22	1012, the last page.	11:35:00

1	A	I am there.	11:35:12
2	Q	And do you see that that Page 19 is a	11:35:12
3		search report, or includes a search report?	11:35:15
4	A	Yes, I do.	11:35:26
5	Q	And do you see that this search report	11:35:27
6		includes three references?	11:35:28
7	A	Yes, I do.	11:35:32
8	Q	In forming the opinions that you provided	11:35:33
9		in your declaration, did you review the three	11:35:36
10		references that are listed in this search report	11:35:39
11		on Page 19 of Exhibit 1012?	11:35:43
12	A	I don't recall. I don't believe so, but	11:35:49
13		they may have been provided to me and I may have	11:35:51
14		reviewed them, but I don't recall at this time.	11:35:53
15	Q	When you reviewed the prior art that you	11:36:48
16		included in your declaration, what was your	11:36:49
17		criteria for evaluating that prior art?	11:36:53
18		MS. SWAROOP: Objection to form.	11:36:57
19	A	And I apologize, but can you clarify?	11:37:05
20		Criteria to accomplish what? My criteria in	11:37:10
21		developing my report?	11:37:13
22	Q	So when you were reviewing the references	11:37:14

1 that you included in the grounds of 11:37:16

2 unpatentability in your declaration, were you 11:37:17

3 reviewing it with any specific criteria in mind? 11:37:22

4 MS. SWAROOP: Objection to form. 11:37:26

5 A Well, feel free to ask again if I'm not 11:37:31

6 understanding the question or answering it 11:37:34

7 directly. 11:37:36

8 But when I considered potential prior art 11:37:37

9 with regard to my involvement in the IPR 11:37:40

10 proceeding, I applied the legal standards and 11:37:44

11 considerations that I've included in my report 11:37:50

12 with regard to anticipation and obviousness, also 11:37:53

13 with regard to what would be considered a prior 11:37:58

14 art as potential -- as could be applied in this 11:38:06

15 case. 11:38:09

16 We could go to my report and I can show 11:38:09

17 you what I understood to be the considerations in 11:38:11

18 those situations. 11:38:13

19 Based on that, then I was considering if 11:38:16

20 these references were appropriate prior art and if 11:38:21

21 they met the aspects of those considerations that 11:38:23

22 I've indicated in my report for anticipation or 11:38:26

1 obviousness.

11:38:31

2 Q I guess that's kind of what I'm getting
3 at. So when you were considering the references,
4 you mentioned that -- or you testified it being
5 appropriate prior art. And I guess my question
6 is, were you looking for the references that you
7 thought were most relevant to the claims of the
8 '148 patent?

11:38:34

11:38:37

11:38:40

11:38:43

11:38:45

11:38:47

11:38:49

9 MS. SWAROOP: Objection to form.

11:38:51

10 A I may not be quite catching the refined
11 questions from the previous one.

11:38:57

11:39:01

12 But again, when I'm looking at the prior
13 art, I was looking to ensure -- not to ensure, but
14 I was looking to consider how that prior art would
15 be appropriate in consideration both as prior art
16 itself and in consideration of anticipation and/or
17 obviousness.

11:39:03

11:39:05

11:39:11

11:39:14

11:39:17

11:39:24

18 And again, that is, as you just stated,
19 specifically with regard to the claim limitations
20 for each and every element of the claims of the
21 '148 patent.

11:39:25

11:39:28

11:39:31

11:39:35

22 Q And so there were references that you

11:39:40

1 considered when preparing your declaration that
2 you did not include in the grounds of
3 unpatentability. Correct?

11:39:41

11:39:45

11:39:47

4 A I believe that is correct. But perhaps
5 just to clarify what "considered" may mean, but I
6 had reviewed a variety of references prior to
7 making a decision how to approach my report.

11:39:51

11:39:55

11:39:59

11:40:05

8 Q And is it safe to say that if a reference
9 was considered but did not -- was not included in
10 your unpatentability grounds, that you didn't
11 consider it to be as relevant as the references
12 that you did ultimately included in the
13 unpatentability grounds?

11:40:10

11:40:14

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11:40:23

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14 MS. SWAROOP: Objection to form.

11:40:27

15 A Generally speaking, you know, this is
16 probably correct. But with the caveat, as I
17 mentioned previously, that, you know, the decision
18 on which references that I would opine on and
19 provide my inputs with regard to, their relevance
20 in the '148 patent IPR, were based on a
21 collaborative discussion with counsel. And the
22 collaborative decision was agreed to.

11:40:31

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11:40:59

11:41:03

1 And, of course, there are aspects of
2 decision-making that perhaps are outside of the
3 primary technical purview on my side. But the
4 decision was a collaborative decision with
5 counsel. And once I had decided on the references
6 that I would opine on with regard to this
7 proceeding, then I moved forward with a detailed
8 analysis with those references.

9 Q Thank you, Dr. Zane. I'd like to
10 introduce your CV.

11 MR. BEMBEN: That's Exhibit 1004.

12 (Vizio Exhibit 1004, previously marked,
13 not attached.)

14 Q You have a copy. Correct?

15 A That is correct. And I have a clean copy
16 here in front of me.

17 Q So I'd like to introduce what has
18 previously been marked as Exhibit 1004. And this
19 I believe is your CV, Dr. Zane.

20 Is that correct?

21 A That is correct.

22 Q And you are here today to testify as a

1	technical expert.	11:42:41
2	Is that correct?	11:42:42
3	A That is correct.	11:42:43
4	Q And what subject matter do you consider	11:42:47
5	yourself to be a technical expert in?	11:42:50
6	A A broad range. I've worked in the	11:42:58
7	industries in and associated with the electronics	11:43:02
8	industry, the power electronics industry, meaning	11:43:05
9	electronic circuitry for processing power,	11:43:11
10	controlling and managing power in a variety of	11:43:14
11	ways, including voltage and current control, the	11:43:17
12	input and output of power supplies that are DC and	11:43:20
13	AC, meaning direct current and alternating current	11:43:25
14	power supplies.	11:43:29
15	And through my career I've worked on a	11:43:31
16	wide variety of applications for these	11:43:33
17	technologies and these techniques. These	11:43:38
18	certainly include the applications relevant here	11:43:40
19	to this proceeding, which include light-emitting	11:43:41
20	diodes, drivers for light-emitting diodes,	11:43:47
21	applications for LEDs, and parallel strings and	11:43:50
22	series connection of LEDs and their application	11:43:54

1 for indication and display for a variety of 11:43:59
2 situations. 11:44:04

3 Q And you are currently a professor in the 11:44:15
4 Department of Electrical and Computer Engineering 11:44:17
5 at Utah State University. Right? 11:44:21

6 A Yes. 11:44:25

7 Q Have you ever taught a course on electric 11:44:25
8 circuit theory? 11:44:33

9 A Yes, generally speaking. 11:44:34

10 Q What is an electric circuit? 11:44:35

11 A Well, this is a very, you know, broad 11:44:41
12 question. 11:44:43

13 But generally speaking, an electrical 11:44:44
14 circuit would be a circuit made up of electrical 11:44:48
15 components, such as resistors, transistors, 11:44:50
16 capacitors, inductors, diodes, et cetera. 11:44:55

17 Q Are you familiar with the term "passive 11:44:59
18 circuit component" or "passive circuit element"? 11:45:04

19 MS. SWAROOP: Objection as outside the 11:45:08
20 scope. 11:45:10

21 A Yes. Again, you know, these are words 11:45:15
22 that can be used in a variety of context, in a 11:45:17

1 variety of ways. You've asked about passive
2 circuit. This is a term that is used in a variety
3 of situations when considering electrical
4 circuits.

5 Q And my question was specific to a passive
6 circuit component. Right?

7 So you're familiar with a passive circuit
8 component. Correct?

9 MS. SWAROOP: Same objection. Outside
10 the scope.

11 A Again, I believe I answered the question.
12 But to -- you know, to be clear, we use the term
13 "passive" as a passive component, maybe a passive
14 circuit. You know, both active and passive
15 circuits could include components that may be
16 considered passive components within a broader
17 circuit.

18 The term can be used in a variety of
19 context. Also there are components, you know, for
20 example inductors or capacitors, that in some
21 situations may be called a passive component
22 depending on what is being described, and others

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11:46:03

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11:46:07

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11:46:17

11:46:20

11:46:23

1 may be called a reactive component because of the 11:46:26
2 energy that they store. 11:46:28

3 I think these terms can be used in 11:46:30
4 different context, in different ways, for 11:46:32
5 circuits. 11:46:36

6 Q And I'm just curious about the context of 11:46:36
7 electrical engineering in general, how these terms 11:46:43
8 are used that industry. 11:46:45

9 So I believe you mentioned a resistor. 11:46:46

10 Correct? 11:46:48

11 A I mentioned a resistor, yes. 11:46:51

12 Q And a resistor, is that a passive 11:46:53
13 component, typically? 11:46:58

14 MS. SWAROOP: Objection. Form? 11:47:02

15 A It really depends on how the resistor is 11:47:03
16 used with the rest of the circuitry that the 11:47:06
17 resistor is applying to. 11:47:09

18 But when discussing a component is active 11:47:11
19 or passive, for example, the resistor itself would 11:47:17
20 typically be considered a passive component. But 11:47:21
21 again, I would need more context to consider if 11:47:23
22 the resistor in the context of a circuit and its 11:47:26

1 application, would be, you know, considered, you
2 know, part of a broader circuit. Which could be,
3 you know, a regulator circuit, it could be a -- it
4 could be an active circuit containing that
5 resistor.

6 Q Going back to your CV. On Page 1 you
7 mention that you have published more than 200
8 peer-reviewed articles.

9 Do you see that?

10 A Yes, I do.

11 Q And so you're familiar with the
12 peer-review process. Correct?

13 A That is correct.

14 Q So what is peer review?

15 A Peer review, that is, generally speaking,
16 a process where peers, meaning those in similar
17 situations that can be considered in the, you
18 know, similar field, similar expertise, but are
19 not a direct authors or contributors to, for
20 example, an article, are given an opportunity to
21 review the work and, you know, consider its
22 merits.

1 The peer-review process is a process
2 whereby peers, or those outside of the article or
3 component being reviewed or considered, are able
4 to consider the merits of that article and provide
5 their inputs and their review prior to the
6 community, through that peer process, determining
7 if that article is appropriate for dissemination
8 and broad use in the field.

9 Q And so what is the objective of the
10 peer-review process?

11 MS. SWAROOP: Objection to form.

12 A Well, generally this could vary depending
13 on context.

14 In the context where I have stated it
15 here and shown publications that have gone
16 through, for example, a peer-review process with
17 the IEEE for conference or journal publication,
18 the purpose would generally be considered to
19 maintain a high quality and standard for that
20 association or for that journal or that
21 publication or that conference.

22 Q Do you believe that the peer-review

1	process for scientific articles is important?	11:50:44
2	A Generally speaking, yes, I do.	11:50:50
3	Q Why is that?	11:50:52
4	A For the same reasons that I just stated	11:50:58
5	regarding the purpose.	11:51:00
6	Q So high quality and maintaining a certain	11:51:01
7	standard.	11:51:07
8	Is that correct?	11:51:07
9	A Generally speaking, that is correct.	11:51:09
10	These allow a general industry and technical	11:51:12
11	society around these industries to continue to	11:51:18
12	grow, and it's important for those industries and	11:51:21
13	societies.	11:51:26
14	Q Have you ever heard of the concept of	11:51:26
15	double-blind peer review?	11:51:32
16	A Yes.	11:51:37
17	Q What is double-blind peer review?	11:51:39
18	MS. SWAROOP: Object as outside the	11:51:42
19	scope.	11:51:44
20	A Well, when we get into terms such as	11:51:47
21	"double-blind," sometimes there are slight	11:51:49
22	differences in how these are interpreted and how	11:51:53

1	they're applied. And there are additional terms	11:51:55
2	that are sometimes added on top of double-blind to	11:52:00
3	be more descriptive of a particular process.	11:52:03
4	But generally speaking, any aspect of a	11:52:06
5	blind review in the peer-review process is	11:52:10
6	intended to remove biases from the review process	11:52:14
7	itself; for example, by not providing the names of	11:52:18
8	authors during the review.	11:52:24
9	Q And why would you want to remove bias	11:52:26
10	from the peer-review process?	11:52:30
11	MS. SWAROOP: Object as outside the	11:52:36
12	scope.	11:52:38
13	You can answer.	11:52:39
14	A Well, of course it's difficult to always	11:52:41
15	ensure that there is a -- an open and fair process	11:52:45
16	in any aspect of review.	11:52:55
17	And so the importance of considering ways	11:52:59
18	to maintain fairness in the process, this is where	11:53:01
19	it is occasionally important to consider different	11:53:11
20	levels and different types of review.	11:53:16
21	There are always positives and negatives	11:53:19
22	in some of that process. And those are considered	11:53:23

1 in each publication, and the processes often 11:53:28
2 change throughout even -- even over time within 11:53:33
3 the given society or a given publication as we as 11:53:37
4 a society continue to work to improve that process 11:53:41
5 and maintain integrity. 11:53:45

6 Removing authors is not always the best 11:53:48
7 approach. Sometimes it is important to know and 11:53:50
8 have -- you know, maintain some credibility in 11:53:55
9 knowing authors as part of the process. Sometimes 11:53:57
10 it's good to separate them from at least part of 11:54:01
11 the review process. It depends in context in some 11:54:05
12 cases. 11:54:09

13 Q Would you agree with me that removing a 11:54:15
14 reviewer's bias would allow the reviewer to 11:54:36
15 objectively review the content of the scientific 11:54:40
16 article? 11:54:45

17 MS. SWAROOP: Object as outside the 11:54:46
18 scope. 11:54:47

19 A I believe I've answered that in my 11:54:50
20 previous response. Again, generally speaking, 11:54:52
21 yes, with some of the caveats depending on the 11:54:58
22 situation. 11:55:00

1 Q Can a reviewer's bias negatively impact
2 their review of an article?

3 MS. SWAROOP: Objection. Form. Outside
4 the scope.

5 A Generally speaking, it would be outside
6 the scope of my expertise, you know, considering
7 different ways that bias impacts behavior.

8 But as I've stated in my previous
9 responses, there can be situations where removing
10 authors as part of a review process can be
11 beneficial, is the common understanding. Not my
12 primary expertise in considering the human factors
13 and behavior side of that equation.

14 Q Just to clarify, when you say "removing
15 authors," do you mean removing them from the
16 article?

17 MS. SWAROOP: Objection to form. Outside
18 the scope.

19 A Well, to clarify, you know, I believe in
20 the context of the question is what I was
21 referring to, which I believe was referring to
22 simply hiding the names of the authors as part of

1	the review process.	11:56:20
2	But, yes, a good point to clarify. I do	11:56:21
3	not mean removing authors from the publication	11:56:25
4	itself.	11:56:27
5	MR. BEMBEN: I would like to introduce	11:57:00
6	Exhibit 1006.	11:57:01
7	(Vizio Exhibit 1006, previously marked,	11:57:02
8	not attached.)	11:57:02
9	Q This is an article titled Digital	11:57:02
10	Architecture For Driving Large LED Arrays with	11:57:04
11	Dynamic Bus Voltage Regulation and Phase Shifted	11:57:07
12	PWM.	11:57:13
13	Do you have a copy of that, Dr. Zane?	11:57:17
14	A Yes, I have a clean copy, and I have it	11:57:28
15	here in front of me.	11:57:30
16	Q And so this article, Exhibit 1006, is an	11:57:33
17	article that you co-authored. Correct?	11:57:39
18	A That is correct.	11:57:46
19	Q And do you want to refer to it as the	11:57:46
20	Zane article or the Zane paper just to clarify	11:57:53
21	that you're Dr. Zane, and this is the Zane	11:57:55
22	article?	11:57:58

1	Can we refer to it that way?	11:57:58
2	A We can refer to it as the Zane article.	11:58:01
3	Or the Doshi article if you prefer. But these are	11:58:03
4	all fine with me.	11:58:08
5	Q Okay. I'll just stick with the Zane	11:58:09
6	article to keep it simple.	11:58:12
7	So do you understand in patent law that	11:58:14
8	prior art must be analyzed from the objective	11:58:15
9	perspective of a person of ordinary skill in the	11:58:18
10	art?	11:58:20
11	A Yes, I do.	11:58:23
12	Q In rendering the opinions that you	11:58:24
13	provided in your declaration, did you analyze your	11:58:28
14	article, Exhibit 1006, from the objective	11:58:30
15	perspective of a person of ordinary skill in the	11:58:33
16	art?	11:58:35
17	A Yes, I believe that I did.	11:58:39
18	Q Did you take any steps to ensure that	11:58:40
19	your subjective knowledge of the article as an	11:58:42
20	author did not influence your view of the article	11:58:45
21	from the perspective of a person of ordinary skill	11:58:48
22	in the art?	11:58:51

1 A Yes, I believe I did, based on -- based
2 on my experience working in both this field as
3 well as my experience with patents, I believe I
4 did my best, which I do believe was sufficient and
5 appropriate, to separate myself as an author from
6 this paper and consider it generally from the
7 perspective of a person of ordinary skill in the
8 art at the time of the invention for the '148
9 patent.

11:58:54
11:58:58
11:59:00
11:59:04
11:59:07
11:59:10
11:59:13
11:59:19
11:59:21

10 In doing so, you know, I applied my
11 understanding of a person of ordinary skill. And,
12 you know, to help support that I recognize that
13 many of the, for example, students on my team that
14 were all graduate research students working in
15 this field, would have met the limitation of a
16 person of ordinary skill at the time.

11:59:21
11:59:24
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11:59:36
11:59:37
11:59:43

17 And I was working with companies as well
18 at that time. And I also knew and had worked with
19 engineers at the time and recognized and
20 understood how they would perceive the material
21 such as the material in this article, in that time
22 frame.

11:59:46
11:59:47
11:59:51
11:59:54
11:59:59
12:00:02

1 Q And so the process that you just 12:00:04
2 described, is that different than the process that 12:00:16
3 you would apply to any other piece of prior art? 12:00:20

4 MS. SWAROOP: Objection to form. 12:00:27

5 A The general process that I've described 12:00:31
6 would be the same as I would apply to any prior 12:00:32
7 art with regard to considering the material, 12:00:37
8 considering the appropriate time frame for the 12:00:39
9 invention or the patent in the case, as well as 12:00:45
10 considering the determined qualifications for a 12:00:49
11 person of ordinary skill in the art. 12:00:55

12 Now, in this case, as this being an 12:00:58
13 article that not only had I read previously but 12:01:01
14 was also a co-author, the process, I believe 12:01:04
15 generally speaking, is the same. But it also 12:01:07
16 includes me taking a fresh perspective in 12:01:11
17 reviewing this material, again with that broad 12:01:14
18 perspective of how a person of ordinary skill in 12:01:18
19 the art would consider that material in that time 12:01:21
20 frame. 12:01:23

21 Q You have served as an expert in many 12:01:28
22 patent cases. 12:02:15

1	Is that correct?	12:02:16
2	A I believe that is a correct	12:02:19
3	characterization.	12:02:21
4	Q And in serving as an expert in those	12:02:23
5	patent cases, do you typically assert your own	12:02:25
6	work as prior art when evaluating validity?	12:02:27
7	A That is generally not the case. In fact,	12:02:36
8	I don't recall. I'm sure some of my prior work	12:02:42
9	has come up in the past, including some of my	12:02:45
10	prior patents. I don't recall if I've asserted --	12:02:47
11	you know, if I've provided direct opinions on	12:02:53
12	those articles or, you know, derivative works in	12:02:57
13	a -- in another case.	12:03:04
14	Q Do you recall if any of the other experts	12:03:05
15	in the cases that you've been involved in have	12:03:08
16	asserted their own work as invalidating prior art?	12:03:11
17	A I don't recall.	12:03:16
18	Q So is it safe to say that it's not	12:03:22
19	typical that you would assert your own work as	12:03:30
20	prior art in a patent case?	12:03:33
21	MS. SWAROOP: Objection to form.	12:03:34
22	A Again, I don't know for sure if it's	12:03:39

1 typical. Again, in my experience, the responses

12:03:40

2 I've given are accurate, to my knowledge.

12:03:44

3 In general, I would anticipate or I would

12:03:51

4 expect it to be unlikely that in any particular

12:03:53

5 case specific prior work, for example, of mine,

12:03:57

6 would happen to align so directly with that case.

12:04:01

7 In this case it is my opinion that it

12:04:09

8 does. But as I've stated, I believe that my

12:04:11

9 expertise are certainly sufficient to separate

12:04:16

10 myself as a co-author and to consider this

12:04:20

11 material from the perspective of a person of

12:04:23

12 ordinary skill in the art at the time of the

12:04:25

13 invention.

12:04:28

14 Q Okay. But you don't recall having ever

12:04:29

15 done that in any of your past work as an expert.

12:04:31

16 Correct?

12:04:34

17 MS. SWAROOP: Objection to form.

12:04:34

18 A I believe I've answered that. And so

12:04:38

19 just to reiterate, I don't recall applying any of

12:04:41

20 my prior publications or patents in another case.

12:04:45

21 I do recall, you know, my work coming up, but I

12:04:49

22 don't -- I don't recall it ever being ultimately

12:04:54

1 applied.

12:04:58

2 Q And so this is then the first patent case
3 that you've worked on where you have had to
4 separate yourself as an author of the reference
5 and analyze it from the perspective of a person of
6 ordinary skill in the art.

12:04:59

12:05:02

12:05:04

12:05:08

12:05:10

7 Correct?

12:05:11

8 A The best of my recollection, I believe
9 that is correct. But again, just to clarify,
10 certainly in other cases some of my prior work has
11 come up, has been considered. I don't believe was
12 directly applied, but similar in those cases I was
13 more involved in the field than a person of
14 ordinary skill in the art. And generally speaking
15 that would be true probably for most cases.

12:05:14

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16 And so in all scenarios that I've been
17 involved in, I would anticipate that all, if not
18 the vast majority, I've had to separate myself
19 from the level of expertise that I did have at the
20 time and recognize what a person of ordinary skill
21 in the art would have recognized at that time for
22 those references.

12:05:42

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12:06:02

12:06:05

Transcript of Regan A. Zane, Ph.D.
Conducted on May 14, 2024

51

1	MS. SWAROOP: Counsel, we've been going	12:06:14
2	about an hour. So if there is a good time for a	12:06:15
3	break, that would be appreciated.	12:06:17
4	MR. BEMBEN: Sure. Let's take a break	12:06:24
5	now. I'm actually trying to follow this on my	12:06:26
6	iPhone, so it's a little challenging. I think I	12:06:28
7	can go grab something from my IT person now, so	12:06:31
8	let's go off the record.	12:06:34
9	(A discussion was held off the record.)	12:06:56
10	VIDEO SPECIALIST: We are going off the	12:06:56
11	record at 12:06 p.m.	12:06:57
12	(A recess was taken.)	12:07:00
13	VIDEO SPECIALIST: We're back on the	12:15:44
14	record at 12:15 p.m.	12:15:48
15	MR. BEMBEN: Thank you.	12:15:55
16	BY MR. BEMBEN:	12:15:54
17	Q Dr. Zane, did you speak with anyone	12:15:55
18	during the break?	12:15:58
19	A Yes.	12:15:59
20	Q Did you speak with anyone about the	12:15:59
21	substance of the interview -- or the deposition?	12:16:04
22	A No.	12:16:06

1	Q	So we were discussing the Zane article,	12:16:06
2		which is Exhibit 1006. Can you turn to Paragraph	12:16:13
3		46 of your declaration. It's on Page 27.	12:16:20
4	A	Yes, I'm there.	12:16:37
5	Q	So Paragraph 46 you're providing some	12:16:38
6		background about the Zane article.	12:16:40
7		Do you want to take a minute to review	12:16:43
8		that.	12:16:45
9	A	Yes, I have.	12:17:11
10	Q	So in Paragraph 46 you mention that you	12:17:12
11		presented the Zane article at APEC 07, that's	12:17:14
12		A-P-E-C.	12:17:23
13	A	Correct. Together with my student at the	12:17:24
14		time, Montu Doshi, who is the lead presenter.	12:17:26
15		That is correct.	12:17:30
16	Q	And also in Paragraph 46 you mention that	12:17:30
17		you had helped organize several IEEE conferences.	12:17:35
18		Do you see that?	12:17:42
19	A	Yes.	12:17:46
20	Q	Did you specifically help organize the	12:17:46
21		APEC 07 conference?	12:17:50
22	A	I don't believe in 2007 I was on the	12:18:00

1 organizing committee. I don't recall for sure my
2 role. I was certainly on the technical committee
3 for the conference, providing technical review and
4 support as appropriate.

5 I was also the web master and provided
6 some additional support in some of the years in
7 that time frame. I don't believe it was 2007,
8 though.

9 Q You mention -- actually, I'll just quote
10 it. In Paragraph 46 you say, "It is my
11 understanding from discussions with the program
12 chair that over 2500 people registered and
13 attended APEC 07."

14 Do you see that sentence?

15 A Yes, I do.

16 Q When you mention that you had discussions
17 with the conference co-chair, when did you have
18 those discussions?

19 A During the time frame in the development
20 of my -- of my declaration.

21 As I've stated here, I know from
22 experience that this conference -- I was going to

12:18:02

12:18:07

12:18:09

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12:18:57

12:19:00

1 estimate certainly well over 1,000 attendees. But 12:19:05
2 I reached out to the program committee, who are 12:19:08
3 peers or colleagues of mine, just to confirm. 12:19:12

4 And so in the development of my report I 12:19:15
5 confirmed that in 2007 they were confident there 12:19:17
6 were more than 2,500 people registered that year. 12:19:20
7 Excuse me. If I can clarify. 12:19:30

8 They confirmed that there were over 2,500 12:19:31
9 people registered and in attendance in 2007. 12:19:34

10 Q And I just want to clarify. So when you 12:19:40
11 prepared the declaration that you provided in this 12:19:42
12 proceeding, you reached out to the conference 12:19:44
13 program chair. 12:19:46

14 Is that correct? 12:19:47

15 A That is correct. 12:19:49

16 Q Okay. I just wanted to make sure I 12:19:49
17 wasn't confusing you with the article. Okay. 12:19:52

18 A That is correct. 12:19:57

19 Q Okay. Thank you. 12:19:57

20 And in Paragraph 47 you provide some more 12:20:05
21 background. 12:20:07

22 Do you want to take a look and let me 12:20:08

1	know when you're ready to discuss that paragraph?	12:20:10
2	A I am ready.	12:20:12
3	Q All right. And about on Page 28 of your	12:20:41
4	declaration, Paragraph 47, kind of towards the	12:20:50
5	middle of the page, you mention that Attendees of	12:20:53
6	APEC 07 would have received a compact disk that	12:20:56
7	stored the electronic form of all conference	12:21:00
8	papers, including your article, the Zane article.	12:21:01
9	Correct?	12:21:07
10	A That is correct, yes.	12:21:08
11	Q Do you recall specifically receiving	12:21:08
12	this, the CD?	12:21:13
13	A Yes, I recall receiving the CD, a program	12:21:18
14	that showed the overall -- you know, a print	12:21:26
15	program of the conference itself.	12:21:29
16	The distribution I also confirmed. So in	12:21:33
17	the same context, in development of my declaration	12:21:36
18	for this proceeding I had reached out to the	12:21:39
19	program committee just to confirm the attendees	12:21:43
20	and the distribution. And so they confirmed the	12:21:45
21	attendees, as I stated previously.	12:21:49
22	And I also asked them to confirm, but	12:21:53

1 they confirmed for me that it was, indeed, a
2 compact disk that they used that year. They
3 checked that it was receipt for a CD.

4 When I was first -- and just to clarify,
5 when I was first developing this declaration I
6 couldn't remember precisely in 2007 versus other
7 years, when the conference switched from compact
8 disks to USB disks. But I was quite certain that
9 I recalled receiving the CD. That's why I reached
10 out to the program committee, and they confirmed
11 that that year it was a CD that was distributed to
12 all attendees.

13 Q Who did you reach out to on the program
14 committee?

15 A It was the program chair for the
16 conference.

17 Q You reached out to the program chair?

18 A I did, yes.

19 Q Do you recall his or her name?

20 A The program chair was Dr. Steve Pekarek.
21 And it's my recollection that was his title for
22 the conference that year. He would have been what

12:21:55

12:21:58

12:22:03

12:22:05

12:22:08

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12:22:43

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12:23:11

12:23:12

1 would have been recognized as I think the second

12:23:16

2 or third in -- in the chain of the development.

12:23:17

3 The way that conference works is you --

12:23:24

4 the -- it's a sequencing of responsibilities. So

12:23:27

5 I believe in 2008 he was the general chair.

12:23:31

6 Q Thank you. Let's turn to Page 94 of your
7 declaration.

12:23:38

12:23:44

8 A I am there.

12:24:02

9 Q And this is where Ground 3 begins.

12:24:02

10 Correct, Subsection E?

12:24:07

11 A That is correct.

12:24:12

12 Q And it's your opinion that the Zane

12:24:13

13 article anticipates Claims 1 through 4, 11, 12,

12:24:17

14 14, 17, and 22 of the '148 patent. Correct?

12:24:22

15 A That is correct.

12:24:30

16 Q And what is your understanding of
17 anticipation?

12:24:31

12:24:32

18 A The -- you know, my understanding of
19 anticipation, and as I've applied it through my
20 analysis, is listed in the relevant legal

12:24:43

12:24:45

12:24:50

21 standards in the earlier section of my report. So

12:24:55

22 I'm just -- I'll still keep on Page 94 here, but

12:25:00

1 I'll also refer back, I believe it's on Page 11,
2 where I have a section titled Anticipation.

3 And so I have two paragraphs there that
4 provide a summary of my understanding with regard
5 to anticipation and a number of the -- which
6 includes key considerations when considering a
7 prior art reference with respect to anticipation.

8 Q And so if we look at Paragraph 22 of your
9 declaration, the last sentence you say, "I
10 understand that a reference anticipates a claim if
11 all elements of the claim are disclosed within the
12 four corners of the reference in the same
13 arrangement as in the claim."

14 Correct?

15 A That is correct.

16 Q And when you analyzed the Zane article in
17 Ground 3 of your declaration, that is the standard
18 of anticipation that you used. Correct?

19 A That is correct.

20 Q So with respect to Claim 1, for example,
21 it's your opinion that the Zane article discloses
22 every element that is recited in Claim 1, in the

1 same arrangement as recited in Claim 1. Correct?

12:26:28

2 A That is correct; you know, as appropriate
3 within this analysis.

12:26:34

12:26:36

4 Q So is it your opinion that you and
5 Dr. Doshi invented the subject matter of Claim 1
6 of the '148 patent?

12:26:41

12:26:45

12:26:48

7 A I believe that's a mischaracterization of
8 the opinions that I've provided here.

12:26:52

12:26:55

9 My opinions here are simply looking from
10 a individual with the perspective of a person of
11 ordinary skill in the art, how they would
12 understand and view the material. And now
13 specific to anticipation, simply applying the
14 standard that we've just discussed and considering
15 if each and every element is contained within this
16 reference.

12:26:59

12:27:01

12:27:04

12:27:07

12:27:13

12:27:16

12:27:20

12:27:24

17 I've provided no opinions as to whether
18 elements that are contained in the Zane article
19 are -- with respect to Claim 1 of the '148 patent,
20 were anything more than anticipation of those
21 elements in Claim 1.

12:27:26

12:27:28

12:27:32

12:27:42

12:27:47

22 Q It's your opinion that the Zane article

12:27:56

1	anticipates Claim 1. Correct?	12:28:10
2	A That's correct, yes.	12:28:12
3	Q And what anticipation means is that the	12:28:12
4	Zane article teaches or discloses every element as	12:28:14
5	arranged in Claim 1. Correct?	12:28:19
6	A That is correct.	12:28:22
7	Q And so my question to you is a question,	12:28:22
8	it wasn't characterizing.	12:28:28
9	I was asking if it's your opinion that	12:28:29
10	you and Dr. Doshi then invented Claim 1, the	12:28:31
11	invention that's described in Claim 1 of the '148	12:28:33
12	patent?	12:28:36
13	MS. SWAROOP: Objection to form. Outside	12:28:36
14	the scope.	12:28:38
15	A And again, I believe I answered the	12:28:41
16	question.	12:28:42
17	First, the opinions that I've provided	12:28:43
18	are included here in my report with regard to the	12:28:44
19	Zane article anticipating Claim 1 as you and I	12:28:47
20	just discussed. And I confirmed.	12:28:51
21	Now I believe you're asking me a new	12:28:53
22	question. And I'm not sure the entire context of	12:28:55

1 that question with regard to whether the authors
2 of that article, which include myself and my
3 student at the time, now Dr. Doshi, invented
4 elements in Claim 1. That's not an analysis that
5 I performed, and I'm not sure what the scope and
6 context of that in particular would be.

7 But I can certainly confirm that there
8 are many aspects of components that are used in
9 the article, the Zane article, that the Zane
10 article itself even indicates were known in the
11 field at the time of that article.

12 With regard to those elements specific to
13 Claim 1, I haven't gone through a careful
14 consideration or, you know, considered it within
15 my scope as to whether the individual elements are
16 considered in any other reference that may be
17 before the Zane article.

18 I mean, I can certainly comment, for
19 example, on the opinions I've provided regarding
20 Thomas and their relation to some of these same
21 elements.

22 Q Okay. I think I see the distinction

12:28:57
12:29:01
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12:29:35
12:29:37
12:29:40
12:29:42
12:29:45
12:29:50
12:29:54
12:29:57
12:29:59
12:30:01
12:30:04
12:30:06

1	you're making. So let me try to rephrase that,	12:30:09
2	then.	12:30:11
3	So is it your opinion that you and	12:30:11
4	Dr. Doshi developed the technology that's	12:30:13
5	described in Claim 1 before the inventors of the	12:30:16
6	'148 patent?	12:30:19
7	A I believe --	12:30:22
8	MS. SWAROOP: Objection. Objection to	12:30:23
9	form.	12:30:24
10	You can answer.	12:30:24
11	A I believe that that's an appropriate	12:30:26
12	characterization. I may not be, you know,	12:30:28
13	understanding the full implications, but I believe	12:30:31
14	that's a correct characterization.	12:30:33
15	Q And it's not a trick question.	12:30:35
16	And we're talking about Claim 1. But the	12:30:39
17	same is true for all of the claims that you	12:30:41
18	addressed in Ground 3. Correct?	12:30:43
19	MS. SWAROOP: Objection. Form.	12:30:47
20	A Yes, I believe that that is correct, with	12:30:48
21	the same caveat that I mentioned.	12:30:51
22	Q And you and Dr. Doshi obtained a U.S.	12:30:53

1 patent on the same subject matter that is

12:30:57

2 described in the Zane article. Correct?

12:30:59

3 MS. SWAROOP: Objection. Form.

12:31:02

4 A I don't recall the full context of the
5 patent. I could go back and review it.

12:31:04

12:31:07

6 But, yes, in short, the work that Montu
7 Doshi, my student at the time, now Dr. Doshi, was
8 working on in that time frame, which included
9 aspects of what was included in this article, were
10 all material that were supported in a patent.

12:31:09

12:31:15

12:31:18

12:31:21

12:31:23

11 Q And I'll direct you to Paragraph 15 of
12 your declaration. Let me know when you're there.

12:31:30

12:31:32

13 A I am there.

12:31:47

14 Q And in the last sentence you say, "I am a
15 co-inventor on U.S. Patent No. 7,948,468, which is
16 also directed towards systems and methods
17 utilizing staggered PWM signals for dimming
18 control of parallelly connected LEDs."

12:31:47

12:31:51

12:31:58

12:32:00

12:32:04

19 Do you see that?

12:32:06

20 A Yes, I do.

12:32:08

21 Q Okay. And so you mentioned this '468
22 patent in your declaration, but you did not rely

12:32:09

12:32:17

1	on it in any of the grounds of unpatentability.	12:32:19
2	Is that correct?	12:32:24
3	A I believe that is correct.	12:32:25
4	Q So why didn't you use the '468 patent in	12:32:25
5	the grounds of unpatentability?	12:32:30
6	A I don't recall. It was certainly	12:32:36
7	material that I was generally familiar with, but	12:32:37
8	it is not one of the materials that were	12:32:42
9	ultimately chosen through the process I described	12:32:46
10	previously in the grounds that I've provided my	12:32:50
11	opinions on.	12:32:54
12	Q Do you currently receive any remuneration	12:33:00
13	associated with the '468 patent?	12:33:04
14	A No, I do not.	12:33:05
15	Q Have you ever received any remuneration	12:33:06
16	associated with the '468 patent?	12:33:09
17	A I don't recall, but I don't believe so.	12:33:17
18	Q Did you receive a grant from the National	12:33:27
19	Science Foundation that led to the development of	12:33:30
20	the subject matter that is described in the '468	12:33:31
21	patent?	12:33:34
22	A The -- I would have to review that patent	12:33:45

1 again to reconfirm specific elements that are 12:34:03
2 included in the patent. 12:34:07

3 As stated in the Zane article that we've 12:34:09
4 referenced, the -- I had received a grant from the 12:34:12
5 National Science Foundation for work generally in 12:34:17
6 solid-state lighting and energy-efficient lighting 12:34:22
7 systems and electronic drive circuits. That work 12:34:26
8 generally supported a variety of aspects of my 12:34:30
9 research program over a number of years, supported 12:34:33
10 the raw development of my laboratory in that time 12:34:38
11 frame. 12:34:42

12 I also in that time frame had sponsorship 12:34:43
13 from industrial partners to develop specific 12:34:45
14 technologies versus the more fundamental work that 12:34:50
15 was supported by the National Science Foundation. 12:34:54

16 So there are aspects of the work that 12:34:57
17 benefitted from both of those funding sources that 12:35:02
18 supported the development of the article. But 12:35:05
19 again with regard to the patent specifically, and 12:35:11
20 specific elements that were patented, I'd have to 12:35:14
21 go back and reconfirm which aspects, if any, were 12:35:16
22 one particular funding source or another. 12:35:20

1 Q In your profession as a professor, is it 12:35:22
2 common for you to seek grants from the National 12:35:30
3 Science Foundation? 12:35:37

4 MS. SWAROOP: Objection to form. Outside 12:35:37
5 the scope. 12:35:38

6 A I don't know how to characterize "common" 12:35:41
7 in this broad space. They are very competitive, 12:35:43
8 for sure. But the National Science Foundation is 12:35:46
9 a -- an agency that supports research in this 12:35:50
10 space. I have receive funding from the National 12:35:54
11 Science Foundation as well as from other 12:35:57
12 government agencies and industry. 12:35:59

13 Q And why have you sought funding from the 12:36:05
14 National Science Foundation and other government 12:36:07
15 agencies in this industry? 12:36:09

16 MS. SWAROOP: Objection to form. Outside 12:36:10
17 the scope. 12:36:11

18 A It's common in my field to pursue 12:36:15
19 government support to help offset industry funding 12:36:17
20 to further the science in these areas. 12:36:20

21 Q Would you say that it's important in your 12:36:23
22 field? 12:36:26

1	MS. SWAROOP: Same objections.	12:36:30
2	A In general, yes. Though again, that's	12:36:32
3	not my primary expertise. But it is important,	12:36:36
4	you know, for my -- at least my personal opinion,	12:36:40
5	to consider federal investment in advancing	12:36:44
6	science that helps alleviate some of the burden in	12:36:53
7	particular for, you know, more fundamental	12:36:57
8	research that can help bridge that gap where	12:37:00
9	industry isn't as able to look as far forward in	12:37:06
10	technology, and help encourage more industry	12:37:09
11	investment such as that that I've been able to	12:37:14
12	receive to pursue particular technologies.	12:37:16
13	Q And you're currently a full professor in	12:37:19
14	the Department of Electrical and Computer	12:37:26
15	Engineering at Utah State University. Correct?	12:37:28
16	A That is correct.	12:37:33
17	Q And on the I guess hierarchy of	12:37:35
18	professors, is that the top rank?	12:37:38
19	A That is.	12:37:42
20	Q What are the ranks below that?	12:37:44
21	A Generally speaking, there are three	12:37:48
22	categories; assistant professor, associate	12:37:49

1 professor, and full professor.

12:37:52

2 Q And in order to be considered for
3 advancement to full professor, is the amount of
4 funding or grants that you received a
5 consideration?

12:38:01

12:38:03

12:38:08

12:38:11

6 MS. SWAROOP: Objection. Form. Outside
7 the scope.

12:38:14

12:38:15

8 A Well, that's a difficult question, and
9 it's a broad one, and not one that I can answer
10 directly.

12:38:18

12:38:21

12:38:26

11 It depends on the committees within the
12 universities, it depends on the decision-making
13 both within committees, departments, and colleges.

12:38:26

12:38:30

12:38:33

14 Generally speaking, there are a broad
15 portfolio of metrics that are considered when
16 making decisions for advancement of a faculty
17 member, for example, within a university system.

12:38:38

12:38:41

12:38:50

12:38:55

18 Funding can be a factor, but often the
19 results of the funding are a more significant
20 factor, such as the impact on students, the
21 development and graduation of students, their
22 employment in the field, and resulting

12:38:58

12:39:02

12:39:05

12:39:10

12:39:12

1 advancements in the field that are a result of

12:39:15

2 that funding.

12:39:18

3 Q Who currently owns the '468 patent?

12:39:19

4 MS. SWAROOP: Objection to form.

12:39:31

5 Q I'm sorry, let me rephrase the question.

12:39:35

6 When I say "the '468 patent," do you know
7 which patent I'm referring to?

12:39:39

12:39:41

8 A Yes, I was just looking back to confirm.

12:39:44

9 Q Let me reask my question, then. Who
10 currently owns Patent 7,948,468?

12:39:45

12:39:48

11 MS. SWAROOP: Objection to form.

12:39:58

12 A It would be my understanding that that is
13 owned by the University of Colorado at Boulder,
14 but I'm actually not certain at this time.

12:39:58

12:40:00

12:40:05

15 Q Do you know whether the owner of the '468
16 patent currently generates any revenue from it?

12:40:06

12:40:08

17 MS. SWAROOP: Objection to form.

12:40:10

18 A I do not know.

12:40:12

19 Q Do you know whether the owner of the '468
20 patent has licensed the patent to another party?

12:40:17

12:40:19

21 MS. SWAROOP: Objection to form.

12:40:21

22 A I do not know that at this time either.

12:40:23

1 Q You applied for the '468 patent while you 12:40:57
2 were at the University of Colorado at Boulder. 12:41:00

3 Is that correct? 12:41:02

4 A That is correct. 12:41:06

5 Q When you applied for the '468 patent, was 12:41:07
6 there an incentive program for professors to file 12:41:12
7 patent applications at the University of Colorado 12:41:15
8 at Boulder? 12:41:20

9 A Broadly speaking, I believe the answer 12:41:24
10 would be yes. But I may not understand the full 12:41:26
11 context of an incentive program. 12:41:29

12 But generally speaking, the, you know, 12:41:31
13 protection of intellectual property that's 12:41:39
14 developed at the university, was encouraged. You 12:41:40
15 know, patents would be considered as an additional 12:41:43
16 product for a faculty as well, this considering 12:41:46
17 impact in the field. 12:41:55

18 And financially I don't recall the 12:41:56
19 details, but there are arrangements for support of 12:41:58
20 research laboratory and the group, for example, 12:42:04
21 should royalties exceed prosecution and management 12:42:07
22 costs of the patent. 12:42:12

1	Q	Did you ever try to develop the	12:42:13
2		technology that's described in the '468 patent?	12:42:33
3		Commercially. Sorry.	12:42:36
4	A	Well, I believe the answer is yes, but	12:42:46
5		certainly with caveats.	12:42:49
6		The purpose of developing the technology	12:42:51
7		was to prove its feasibility and present it on a	12:42:52
8		path for potential commercialization. That	12:42:56
9		particular work, for example, was funded within	12:43:00
10		industry. The work was, you know, presented to	12:43:03
11		partners, including a broad base of industry	12:43:08
12		partners that were within the research center that	12:43:10
13		I was a part of at the University of Colorado at	12:43:15
14		Boulder.	12:43:17
15		And many, if not most, of the students	12:43:20
16		involved in the related work were hired into	12:43:23
17		industry to do work in a similar -- in a similar	12:43:27
18		field.	12:43:32
19		That would be a typical path for	12:43:32
20		commercialization for work within that	12:43:34
21		industry-sponsored research center. That would be	12:43:36
22		to have access to both student talent and	12:43:38

1 intellectual property. And many companies would
2 hire students and further develop the technologies
3 internally, potentially with consultation with the
4 university or with myself.

5 But that was certainly, you know, an
6 aspect of the work that we do. We help students
7 understand entrepreneurship, commercialization,
8 and we develop hardware and demonstration of that
9 hardware sufficient to bring it to the next page,
10 which would be to take that technology internally
11 to a company.

12 Q In your answer you mentioned a broad base
13 of industry partners.

14 Do you recall any of those industry
15 partners?

16 A I don't recall who that included, which
17 companies that included at that particular time.
18 Of course this would be a time frame of students
19 that were working in this space leading up to, for
20 example, the article, as well as the patent, the
21 '468 that we've referred to.

22 I don't recall who all was a member at

12:43:43

12:43:47

12:43:50

12:43:54

12:43:56

12:44:00

12:44:02

12:44:05

12:44:10

12:44:16

12:44:19

12:44:22

12:44:31

12:44:33

12:44:35

12:44:45

12:44:50

12:44:55

12:44:57

12:45:00

12:45:05

12:45:08

1 that time of the research center. The -- it 12:45:11
2 certainly included at least National 12:45:17
3 Semiconductor, who was one of the companies that 12:45:21
4 was more directly involved with -- with an aspect 12:45:23
5 of this work. National Semiconductor being a 12:45:29
6 company that was later acquired by Texas 12:45:35
7 Instruments. 12:45:40

8 Q And just to try to put a time frame 12:45:40
9 around this, can you recall when, the years that 12:45:45
10 this was taking place? 12:45:50

11 MS. SWAROOP: Objection. Form. 12:45:52

12 A I don't recall for sure. But, you know, 12:45:57
13 just for reference I'm going to look back at my 12:46:01
14 CV. 12:46:05

15 I would estimate the time frame to be 12:47:04
16 from 2003, approximately, through 2008 or 2009. 12:47:06

17 In 2009 most likely. 12:47:33

18 Q Thank you. Let's take a look at your 12:47:41
19 article, the Zane article, Exhibit 1006. And 12:48:00
20 let's go to Figure 3 on Page 291. 12:48:04

21 A Okay, I am there. 12:48:40

22 Q And I'm looking at Figure 3, and the 12:48:40

1 description of Figure 3 below. And it mentions
2 that there is a linear programmable current
3 regulator that's shown in Figure 3.

4 Do you see that?

5 A Yes, I do.

6 Q What is a current regulator?

7 A A current regulator, you know, can be
8 considered in a variety of contexts. You know, it
9 would be used depending on that context. And
10 these terms are often used in a variety of -- a
11 variety of ways.

12 In this particular case in Figure 3, the
13 current regulator is pointing specifically to a
14 particular implementation of a current regulator,
15 which is described as a precision programmable
16 current sink in Figure 4. So that particular
17 implementation of a current regulator, which is a
18 linear current regulator, is shown in Figure 4 in
19 this particular context.

20 But regulators, of course, could take on
21 different forms, and what's within the scope of
22 the current regulator would really depend on the

12:48:43

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12:48:52

12:48:55

12:49:03

12:49:04

12:49:23

12:49:25

12:49:31

12:49:35

12:49:38

12:49:39

12:49:45

12:49:48

12:49:53

12:49:58

12:50:01

12:50:03

12:50:07

12:50:18

12:50:20

12:50:23

1 context.

12:50:25

2 Q What is the purpose of a current
3 regulator?

12:50:26

12:50:34

4 A As would be the case in many circuit
5 components, it would depend on the context in
6 which it's described and how it is applied and
7 used.

12:50:37

12:50:39

12:50:41

12:50:45

8 "Current regulator" is a fairly broad
9 term that wouldn't convey a specific confined
10 purpose or implementation in and of itself.

12:50:47

12:50:50

12:50:58

11 Here in this particular context, in
12 Figure 3 and its reference to Figure 4, the
13 current regulator is a set circuit. It's setting
14 the current in each of these parallel chains.
15 When I say "chain," what I meant was each of these
16 series connected strings in a parallel path that
17 are shown in Figure 3 of LEDs.

12:51:02

12:51:05

12:51:08

12:51:12

12:51:17

12:51:20

12:51:23

18 Q I'm just going to look at the '148 patent
19 for -- real quick, if you could turn to that, the
20 front page.

12:51:36

12:51:52

12:51:55

21 And do you see that the filing date of
22 the patent is April 8, 2008?

12:52:05

12:52:06

1	A	Yes, I do.	12:52:13
2	Q	And the April 8, 2008, date is the date	12:52:13
3		that you used when evaluating the patent and the	12:52:18
4		prior art, that's the date of invention.	12:52:22
5		Correct?	12:52:24
6	A	I believe that is correct. It was my	12:52:26
7		understanding, and I believe I've stated that as	12:52:31
8		appropriate here in the early section of my	12:52:33
9		declaration.	12:52:38
10	Q	Yes, I believe you did, too. So I think	12:52:38
11		it's on Paragraph 21 of your declaration.	12:52:50
12	A	Thank you, yes. That is the paragraph I	12:52:58
13		was thinking of.	12:53:00
14	Q	So the reason I ask is, in the April 2008	12:53:00
15		time frame, is the term "current regulator"	12:53:07
16		something that a person of ordinary skill in the	12:53:12
17		art would have been familiar with?	12:53:14
18	A	Again, generally speaking, I believe that	12:53:22
19		the answer is yes. But a skilled person would	12:53:24
20		also be looking for some context to consider what	12:53:28
21		is being implied and how the current regulator in	12:53:32
22		that case would be realized or what its function	12:53:36

1 would be. Because, again, it's a very broad term.

12:53:39

2 Q In the context of the '148 patent, the
3 '148 patent describes current rate -- current
4 regulator. Correct?

12:53:42

12:53:54

12:53:58

5 A The '148 patent uses the term "current
6 regulator," and I don't recall for certain how
7 many times.

12:54:11

12:54:14

12:54:21

8 It doesn't provide a lot of additional
9 description, but it provides an example of a
10 current regulator. And so I believe that it
11 provides an example of a current regulator as one
12 of its embodiments, and it uses the term "current
13 regulator" in some of the dependent claims, that
14 is correct.

12:54:21

12:54:23

12:54:26

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12:54:32

12:54:36

12:54:45

15 Q And what is the example of a current
16 regulator that you just referred to?

12:54:45

12:54:47

17 A Figure 5 in the '148 patent, if we look
18 on Column 3 in the description of Figure 5, it
19 describes "Figure 5 illustrates one type of
20 current regulator for a single parallel path
21 receiving a staggered PWM brightness control
22 signal."

12:55:06

12:55:10

12:55:14

12:55:17

12:55:23

12:55:27

1 And if we go back to Figure 5, I would
2 recognize that being within the context of what
3 the patent is considering a current regulator, the
4 circuit that's shown here in Figure 5.

5 Q The purpose of the circuit that's shown
6 in Figure 5 of the '148 patent is to regulate the
7 current that is driven through the LED 12 in this
8 case.

9 Is that right?

10 A I believe that is correct. It's shown in
11 the terminology and context of the '148 patent as
12 being an example or a type of what is described as
13 a current set circuit, I believe. And in the
14 context of the '148, that's understood to be at
15 least encompassing the function that you've just
16 described.

17 Q Okay. Let's set the '148 patent to the
18 side.

19 MR. BEMBEN: And I would like to
20 introduce what has previously been marked as
21 Exhibit 1005. This is U.S. Patent Number
22 5,317,307. This is what you I believe referred to

1 as Thomas.

12:57:22

2 (Vizio Exhibit 1005, previously marked,
3 not attached.)

12:57:25

12:57:25

4 A That is correct. And I do have a clean
5 copy of Thomas here in front of me.

12:57:46

12:57:48

6 Q All right. Thank you.

12:57:52

7 And so you have, when preparing the
8 opinions that you provide in your declaration, you
9 reviewed the Thomas patent. Correct?

12:57:54

12:57:56

12:57:58

10 A Yes.

12:58:03

11 Q You understand Thomas. Correct?

12:58:04

12 A Yes, that is my understanding.

12:58:07

13 Q Okay. So let's take a look at Figure 1.

12:58:08

14 MS. SWAROOP: And you can take a look at
15 Figure 1, you can review the accompanying
16 description, and just let me know when you're
17 ready to discuss.

12:58:26

12:58:29

12:58:31

12:58:33

18 A I am ready.

12:59:02

19 Q Okay. So looking at Figure 1, on the
20 left-hand side of Figure 1 in Thomas, it shows a
21 system bus, which is labeled 1.

12:59:02

12:59:08

12:59:10

22 Do you see that?

12:59:12

1	A	Yes, I do.	12:59:21
2	Q	And towards the middle of Figure 1 there	12:59:22
3		are activation switches 5, 6, 8, and 7.	12:59:25
4		Do you see those?	12:59:29
5	A	Yes, I do.	12:59:41
6	Q	And focusing in on activation switch 5,	12:59:42
7		the system bus 1 is connected to the activation	12:59:48
8		switch 5 by control line 20.	12:59:51
9		Do you see that?	12:59:54
10	A	Yes, I do.	13:00:07
11	Q	And control line 20 carries control	13:00:07
12		signal W. Right?	13:00:12
13	A	I believe that is correct.	13:00:20
14	Q	And this control signal W is applied as	13:00:20
15		an input to the activation switch 5. Correct?	13:00:24
16	A	That is correct.	13:00:30
17	Q	Looking at the bottom of Figure 1, there	13:00:32
18		is a pulse width modulator 17 that's labeled	13:00:38
19		modulator 17.	13:00:41
20		Do you see that?	13:00:43
21	A	Yes, I do.	13:00:46
22	Q	And modulator 17 is also connected to the	13:00:46

1	activation switch 5.	13:00:51
2	Do you see that?	13:00:53
3	A Yes, I do.	13:00:56
4	Q And modulator 17 outputs modulating	13:00:56
5	signal E. Correct?	13:01:02
6	A That is correct, to my understanding.	13:01:06
7	Q And so that modulating signal E is	13:01:08
8	applied as input to the activation switch 5.	13:01:12
9	Correct?	13:01:17
10	A That is correct.	13:01:22
11	Q Okay. And so the control signal W from	13:01:23
12	system bus 1 and the modulating signal E from	13:01:28
13	modulator 17 are both provided as input to	13:01:34
14	activation switch 5. Correct?	13:01:39
15	A That is correct, to my understanding.	13:01:44
16	Q And then Figure 2 of Thomas, if you take	13:01:49
17	a look at Figure 2.	13:01:51
18	A Yes, I'm there.	13:01:56
19	Q That Figure 2 of Thomas shows activation	13:01:57
20	switch 5 in more detail. Right?	13:02:00
21	A That is correct, in addition to	13:02:06
22	additional elements.	13:02:10

1	Q	And Figure 2 shows the activation switch	13:02:12
2		as including four AND gates which are labeled 32.	13:02:18
3		Correct?	13:02:23
4	A	That is correct.	13:02:24
5	Q	Each AND gate accepts as input control	13:02:24
6		signal W from the system bus 1 and modulating	13:02:31
7		signal E from the modulator 17. Right?	13:02:36
8	A	That is correct.	13:02:41
9	Q	And each of the AND gates 32 is connected	13:02:42
10		to a resistor, which is actually unlabeled in the	13:02:45
11		figure.	13:02:50
12		Is that right?	13:02:50
13	A	That is correct.	13:02:53
14	Q	And each of those unlabeled resistors is	13:02:54
15		connected to a bipolar junction transistor, BJT,	13:02:57
16		which is labeled 33. Correct?	13:03:07
17	A	That is my understanding, correct.	13:03:09
18	Q	And so the AND gates 32, the BJTs 33, and	13:03:10
19		the unlabeled resistors between those AND gates	13:03:15
20		and the BJTs, form the activation switch 5.	13:03:19
21		Is that what's shown in Figure 2?	13:03:22
22	A	That would be my understanding, yes, as	13:03:28

1	one example.	13:03:31
2	Q And then in Figure 2 the activation	13:03:32
3	switch 5 is connected to four resistors, which in	13:03:35
4	turn are connected to four LEDs, which are --	13:03:42
5	those are the ones that are labeled 34, 35, 36,	13:03:46
6	and 37.	13:03:49
7	Is that accurate?	13:03:50
8	A That is accurate.	13:03:52
9	MR. BEMBEN: I just lost my real-time	13:04:08
10	feed. Give me one second.	13:04:10
11	Q So let's look at your -- turn back to	13:04:33
12	your declaration, and turn to page -- I'm sorry,	13:04:35
13	Paragraph 62, which is on Page 42. The section	13:04:39
14	that I'm directing you to is discussing Limitation	13:04:53
15	1[b].	13:04:57
16	Let me know when you're there.	13:04:59
17	A I am there.	13:05:04
18	Q Okay. And you could take a look, you	13:05:05
19	know, just refresh your memory on this Paragraph	13:05:09
20	62, 63 of your declaration.	13:05:12
21	A I'm ready.	13:05:43
22	Q Limitation 1[b] requires a plurality of	13:05:44

1	current set circuits. Right?	13:05:49
2	A That is correct.	13:05:55
3	Q And correct me if I'm wrong, I'm just	13:05:56
4	looking at your declaration, but it's your opinion	13:06:03
5	that each of the resistors that you highlighted in	13:06:05
6	green on Page 43 of your declaration is a current	13:06:08
7	set circuit.	13:06:12
8	Is that right?	13:06:13
9	A That is correct, including at least the	13:06:24
10	resistor R and its -- and its behavior, its	13:06:25
11	function, together with the power supply voltage	13:06:29
12	and the LED that it is in series with, and the	13:06:33
13	transistor that really in this case acts as an on	13:06:38
14	and off switch to become a current set circuit.	13:06:41
15	Q I want to try to clarify that answer.	13:06:44
16	So is it your opinion that the resistor,	13:07:04
17	the power supply, the LED that is in series with	13:07:09
18	it, and the transistor is the current set circuit?	13:07:11
19	A That's not entirely accurate. And I do	13:07:33
20	appreciate the clarification.	13:07:35
21	The -- well, as I stated, for example, at	13:07:37
22	the end of Paragraph 63, Thomas discloses the	13:08:01

1 resistors connected in series with the LEDs. And 13:08:07
2 it is my opinion that those resistors are current 13:08:10
3 set circuits. 13:08:15

4 And the statement I made previously was a 13:08:18
5 clarification of this point that I'm making here, 13:08:22
6 that current set circuits configured to control 13:08:24
7 the current to the LED, meaning the current to the 13:08:29
8 LED when that path is on. 13:08:32

9 And the way that it's configured to act 13:08:34
10 as the current set circuit is the way that I 13:08:37
11 described, which is through the rest of this 13:08:39
12 paragraph; through the regulated power supply 13:08:41
13 voltage V and the associated voltage that would be 13:08:43
14 applied across that resistor, which sets the 13:08:48
15 current through the LED as described in that 13:08:51
16 Paragraph 63. 13:08:55

17 Q Are you familiar with variable resistors? 13:08:57

18 A Yes. 13:09:47

19 Q What is a -- sorry. 13:09:48

20 A No. Please. 13:09:51

21 Q I was just going to say, what is a 13:09:51
22 variable resistor? 13:09:54

1	MS. SWAROOP: Objection to form. Outside	13:09:55
2	the scope.	13:09:56
3	A A variable resistor again is a broad term	13:09:59
4	that can be used in a variety of contexts.	13:10:03
5	Typically it would indicate that, you	13:10:08
6	know, a component would have some resistance, and	13:10:10
7	that the resistance associated with that component	13:10:15
8	would vary under certain conditions.	13:10:19
9	But again, this can be applied to a wide	13:10:21
10	range of applications or purposes with a wide	13:10:24
11	range of what may cause the resistance to vary.	13:10:27
12	And even any resistor could also be considered a	13:10:33
13	variable resistor in some regards. But there are	13:10:36
14	resistors designed to have a particular variation	13:10:39
15	in response to particular conditions.	13:10:42
16	But again, it's a general term that can	13:10:45
17	be used in a variety of ways.	13:10:48
18	Q Thank you. Do you agree with me that	13:10:50
19	Thomas does not disclose that the resistors that	13:10:53
20	you've highlighted in green are variable	13:10:57
21	resistors?	13:11:04
22	A Generally speaking, I would agree with	13:11:06

1 you. I don't recall a particular disclosure in 13:11:08
2 Thomas that the resistors would be specifically 13:11:11
3 realized to achieve a particular variation in its 13:11:17
4 resistance. Not to mean a skilled person wouldn't 13:11:23
5 consider a variable resistor for some purposes. 13:11:28
6 But I don't recall that in Thomas, and I don't 13:11:31
7 recall in my opinions relying on variable 13:11:33
8 resistance. 13:11:36

9 Q And so would a person of ordinary skill 13:11:37
10 in the art have understood that the resistors that 13:11:42
11 you highlighted here in green are -- have fixed 13:11:46
12 resistance values? 13:11:51

13 A Generally speaking, I believe that's an 13:11:59
14 appropriate characterization. Again, there may be 13:12:00
15 reasons a skilled person would consider variation, 13:12:05
16 but that has not been part of my analysis and 13:12:08
17 opinions that I've provided. 13:12:10

18 Q And can you turn to Paragraph 63 of your 13:12:12
19 declaration. And I'm looking at Page 44. Kind of 13:12:24
20 towards the middle of the page you mention that 13:12:30
21 the current flowing through the LED, and there 13:12:32
22 you're referring to the circuit that's in Thomas, 13:12:36

1	that that's connected to the resistor, has a	13:12:39
2	maximum current of $I = \frac{V - V_{LED}}{R}$, open paren, V minus	13:12:41
3	V_{LED} , close paren, over R.	13:12:48
4	Do you see that equation?	13:12:51
5	A Yes, I do.	13:12:53
6	Q And in that equation V is the power	13:12:56
7	supply voltage?	13:13:00
8	Is that correct?	13:13:00
9	A That's correct, V is the regulated power	13:13:01
10	supply voltage of the power supply.	13:13:04
11	Q And in Thomas does the power supply	13:13:07
12	provide a constant voltage?	13:13:11
13	A In Thomas, the power supply would be	13:13:15
14	understood as, you know, either a constant voltage	13:13:18
15	or a regulated voltage. There may be reasons for	13:13:20
16	that to vary, which were not, as I understand it,	13:13:23
17	a point of Thomas.	13:13:28
18	But it would be understood that that	13:13:30
19	would be a regulated voltage at least in the	13:13:31
20	context of what Thomas describes; that one of the	13:13:34
21	purposes of having a delayed or phase-shifted	13:13:37
22	control of these parallel paths is to improve or	13:13:43

1 support the regulation of that power supply. 13:13:46

2 Q So in Thomas it is possible that the 13:14:06
3 power supply voltage varies? 13:14:09

4 A In Thomas it's possible. But that's not 13:14:14
5 described as a part of the -- the embodiment or 13:14:17
6 operation in Thomas, as I understand. 13:14:20

7 It would -- to the extent that the power 13:14:24
8 supply varies in Thomas, you know, that's 13:14:26
9 conceivable and could be applied, a skilled person 13:14:31
10 would understand this. 13:14:35

11 But the -- that's not an aspect that's 13:14:37
12 described as a component in Thomas or in any way 13:14:39
13 in my analysis with regard to Thomas as a 13:14:47
14 reference to these claims. 13:14:51

15 Only in my regard that the voltage is 13:14:53
16 a -- associated with a power supply, which may be, 13:14:57
17 for example, a switching power supply; and that it 13:15:00
18 has a goal of regulating the voltage. And by 13:15:04
19 applying the concept of Thomas, which is to delay 13:15:07
20 or phase-shift the volts with modulation of the 13:15:11
21 LEDs in their parallel paths, that that relieves 13:15:15
22 some of the burden or regulation of that power 13:15:19

1 supply voltage.

13:15:22

2 Q And so I think we agreed earlier that in
3 Thomas the resistors that you highlighted in green
4 are -- have fixed resistance values. Correct?

13:15:24

13:15:37

13:15:40

5 A With the comments that I've made
6 previously, I believe that's been answered. And I
7 do believe that's generally correct.

13:15:49

13:15:54

13:15:56

8 As I mentioned, there could be reasons
9 that a skilled person may vary the resistance, but
10 I don't believe there's -- I don't recall a
11 discussion or description of that in Thomas, nor
12 have I applied an aspect of that in my analysis
13 considering the opinions I've given here for each
14 of the claim limitations.

13:15:58

13:16:01

13:16:05

13:16:07

13:16:11

13:16:14

13:16:17

15 Q And so applying the formula that you
16 provided in the middle of Page 44, the one that I
17 just described, I equals V minus V_{LED} over R , if R
18 is fixed and V , the voltage across the -- or the
19 voltage of power supply varies, that will change
20 the current.

13:16:19

13:16:25

13:16:30

13:16:34

13:16:38

13:16:41

21 Is that correct?

13:16:42

22 A If the voltage were to vary, the voltage

13:16:45

1 V in that equation from the power supply, then it 13:16:48
2 is correct the current would follow the equation 13:16:51
3 that I've given here. 13:16:54

4 But as I've described, the purpose of 13:16:56
5 Thomas is to support a regulated power supply and 13:16:58
6 its output. It would be my understanding that 13:17:01
7 that voltage would either be fixed, or if it did 13:17:04
8 vary it would vary according to an intended 13:17:06
9 purpose; such as to adjust the current. In this 13:17:09
10 case it would be adjusting the current in all of 13:17:14
11 the strings, not the individual string, according 13:17:16
12 to the same equation that each parallel path would 13:17:20
13 follow. 13:17:23

14 But the voltage would be a known voltage 13:17:23
15 in control of the designer for that power supply. 13:17:26

16 Q In this equation that you have, V LED is 13:17:32
17 the voltage drop across the LED. Correct? 13:17:40

18 A That is correct. And the voltage across 13:17:44
19 an LED, as I believe I've described above, but is 13:17:47
20 known in the field, this voltage would be a 13:17:52
21 relatively small voltage for individual LEDs. Of 13:17:54
22 course that can increase with LEDs in series. And 13:17:58

1 it would follow the typical current-versus-voltage 13:18:00
2 characteristic of a diode, which is what a 13:18:03
3 light-emitting diode or LED is. Which has a very 13:18:06
4 strong, you know, exponential relationship, 13:18:09
5 meaning a very small change in voltage would cause 13:18:12
6 a large change in the current, typically, if the 13:18:14
7 LED is in the on state, meaning it's emitting some 13:18:17
8 light. 13:18:22

9 That's really the purpose of having the 13:18:23
10 resistor in the circuit, it dramatically changes 13:18:26
11 that relationship and provides a much shallower 13:18:28
12 response to any changes in voltage, helping to set 13:18:32
13 the current for that LED. 13:18:35

14 Q I think you just answered this. I'm just 13:18:37
15 going to ask it. 13:18:48

16 In your declaration you mentioned that 13:18:49
17 the LEDs have a relatively constant voltage drop 13:18:51
18 across them. 13:18:57

19 Do you see that? It's in the second 13:18:57
20 sentence or line on Page 44? 13:19:00

21 A That is correct. 13:19:04

22 Q And just what do you mean by "relatively 13:19:05

1	constant"?	13:19:09
2	A In this context I simply mean that when	13:19:13
3	an LED becomes forward biased as a diode, that the	13:19:18
4	current voltage characteristic has this sharp	13:19:29
5	response, as I've described.	13:19:32
6	Meaning in this case it's not linear. It	13:19:33
7	has a much sharper response, which would typically	13:19:35
8	be accepted as an exponential response, at least	13:19:38
9	during part of its character -- part of its	13:19:42
10	operation.	13:19:43
11	So in this case, compared to a linear	13:19:45
12	element like a resistor that's appropriately	13:19:48
13	operating as a linear component, if you were to	13:19:51
14	change the current through that device, you would	13:19:55
15	get a very -- a small increment voltage for an	13:19:59
16	increment in current. Meaning you could have a	13:20:07
17	ten times increase in current and still a small,	13:20:11
18	significantly smaller than ten times increase in	13:20:15
19	voltage.	13:20:17
20	So I use that term loosely here, but it	13:20:18
21	was to recognize in particular the difference	13:20:21
22	between a linear element like a resistor which has	13:20:23

1 a roughly proportional change, ten times increase 13:20:26
2 in current you would get a ten times increase in 13:20:29
3 voltage; versus this nonlinear diode as an LED, 13:20:31
4 where if you have a significant increase in 13:20:36
5 current you would have a relatively small, in this 13:20:38
6 case compared for example to a linear element, 13:20:42
7 change in voltage. 13:20:44
8 Q Okay. And the voltage drop across an LED 13:20:48
9 also depends on the type of LED. 13:20:56
10 Is that right? 13:20:58
11 A That is correct. I don't know exactly 13:21:01
12 what's intended here by "type." But the voltage 13:21:04
13 drop across an LED would depend on the particular 13:21:07
14 device. 13:21:10
15 Q And so, for example, different color LEDs 13:21:12
16 might have different voltage drop across them? 13:21:16
17 A That is correct. LEDs of different 13:21:20
18 colors, different ratings, may have different 13:21:23
19 voltage drops across them. Meaning when you apply 13:21:30
20 this equation that I've shown here, for example, 13:21:32
21 the particular types of LEDs being driven, the 13:21:35
22 voltage for LED would need to be known in order to 13:21:39

1	set the current by selecting the resistor.	13:21:43
2	MS. SWAROOP: Counsel, we've been going	13:21:51
3	about an hour, so if there is a good time for a	13:21:52
4	break, that would be appreciated.	13:21:54
5	Q Dr. Zane, are you ready for a break?	13:22:09
6	A Any time that's appropriate. I drink a	13:22:11
7	lot of water. I could appreciate a break. But if	13:22:13
8	we're in the middle -- if we're in the middle of a	13:22:17
9	component, I'm happy to finish it out.	13:22:19
10	MR. BEMBEN: That's fine. Let's take a	13:22:20
11	break now. Another ten-minute broke, does that	13:22:22
12	work?	13:22:25
13	THE WITNESS: Yeah. Was that	13:22:27
14	appropriate? I could probably go shorter. But if	13:22:27
15	ten minutes works for everybody, that's fine.	13:22:27
16	MR. BEMBEN: Ten minutes is good. That	13:22:27
17	sounds good. Let's go off the record.	13:22:36
18	VIDEO SPECIALIST: We're going off the	13:22:36
19	record at 1:22 p.m.	13:22:38
20	(A recess was taken.)	13:22:40
21	VIDEO SPECIALIST: We're back on the	13:34:49
22	record at 1:34 p.m.	13:34:54

1	MR. BEMBEN: Thank you.	13:34:58
2	BY MR. BEMBEN:	13:34:58
3	Q Dr. Zane, did you discuss the substance	13:34:59
4	of your interview with anyone during the break?	13:35:02
5	A No.	13:35:04
6	Q Thank you.	13:35:04
7	Let's turn to Paragraph 76 of your	13:35:09
8	declaration, and that's on Page 54. Feel free to	13:35:12
9	take a minute to review that section of your	13:35:23
10	declaration.	13:35:27
11	A I'm ready.	13:36:23
12	Q On Page 54, about the third line from the	13:36:24
13	bottom, you have a sentence that says, "By	13:36:28
14	definition, all shift registers must receive a	13:36:31
15	clock signal to shift the bits."	13:36:34
16	Do you see that?	13:36:36
17	A Yes, I do.	13:36:47
18	Q Have you ever heard of an asynchronous	13:36:48
19	shift register?	13:36:51
20	A Yes, I have.	13:37:12
21	Q An asynchronous shift register does not	13:37:13
22	use a clock signal to shift the bits.	13:37:20

1	Is that correct?	13:37:27
2	A Well, you know, broadly speaking, the	13:37:28
3	concept of a shift register is what I've described	13:37:31
4	here. That they -- a shift register is simply	13:37:36
5	a -- you know, is -- for example, I've stated here	13:37:45
6	in Paragraph 77, quoting from Digital Electronic	13:37:50
7	Circuits and Systems, you know, it's an array, in	13:37:52
8	often cases a linear array or a one-dimensional	13:37:56
9	array, of flip-flops, as is stated here; but of	13:38:00
10	storage elements for storing binary data.	13:38:06
11	One way or another, you know, all shift	13:38:11
12	registers require a signal to shift the data down	13:38:13
13	the register. Now, there is terminology that's	13:38:19
14	used for more specific, you know, implementations	13:38:23
15	in different scenarios.	13:38:27
16	The question that you've asked is around	13:38:31
17	what is occasionally considered as additional	13:38:35
18	limitation in terminology, such as asynchronous	13:38:39
19	and presumably there would then be also	13:38:43
20	synchronous. What these really refer to is	13:38:46
21	registers, in this case shift registers, that	13:38:49
22	would, you know, operate in different ways on how	13:38:53

1 they shift data down the register.

13:38:56

2 A synchronous register would have a
3 dedicated input where the clock would typically be
4 connected that would be the signal that shifts the
5 data down that register.

13:39:01

13:39:04

13:39:06

13:39:10

6 The asynchronous register again might
7 be -- used in different context, it might actually
8 refer to different circuitry, depending on the
9 application, but generally speaking, is one that
10 would effectively derive the clock or derive the
11 decision to shift down the register from the data
12 itself. In both cases, you know, it's necessary
13 to make the decision to shift the data down the
14 path.

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15 So either the concept of the clock is
16 embedded in the data -- and that's often what's
17 used and what's broadly referred to as
18 asynchronous shift registers -- or there's a
19 dedicated clock that shifts the data that's
20 available.

13:39:41

13:39:43

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13:39:49

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13:39:55

21 You know, for example, here in Thomas it
22 would certainly be expected to be one that doesn't

13:39:58

13:40:00

1	rely on the data to shift -- the data itself to	13:40:01
2	extract the clock, most likely, anyway. Because	13:40:07
3	it's already stated that, for example, the volts	13:40:10
4	with modulation data is shown through the figures	13:40:16
5	to have a constant value, for example, during	13:40:19
6	multiple time shift periods. Which would make it	13:40:22
7	impossible to extract the effective clock or the	13:40:26
8	ability to shift the data down the register	13:40:28
9	without the -- a clock signal to achieve that	13:40:31
10	function.	13:40:34
11	Q So would you agree with me that in an	13:40:42
12	asynchronous shift register does not necessarily	13:41:40
13	receive a clock signal to shift the bits?	13:41:42
14	A I believe I've answered that. But just	13:42:01
15	to restate, any shift register, including an	13:42:03
16	asynchronous shift register, would have to derive	13:42:06
17	an effective clock to shift the data down the	13:42:09
18	register.	13:42:11
19	In an asynchronous register, that would	13:42:12
20	typically not include a separate dedicated clock	13:42:15
21	from the data going into the register itself. And	13:42:17
22	as I stated, you're looking at Thomas, you know,	13:42:22

1 the data clearly doesn't include that, that
2 signal, the data meaning the PWM signal E, in
3 order to sufficiently shift the data down the
4 register as described in Thomas.

13:42:25

13:42:28

13:42:33

13:42:35

5 Q By April 2008 were asynchronous shift
6 registers known in the art?

13:42:41

13:42:44

7 A Yes, I believe that they were.

13:42:51

8 Q Let's take a look at Paragraph 126 of
9 your declaration that's on Page 81. And please
10 take a minute to review Paragraph 126.

13:42:56

13:43:00

13:43:13

11 A Okay, I am there, and I've had time to
12 review.

13:44:11

13:44:13

13 Q So the first sentence in Paragraph 126
14 you state, "An integrated circuit is simply a
15 circuit that is fabricated in a package, often on
16 a semiconductor substrate."

13:44:13

13:44:16

13:44:19

13:44:23

17 Do you see that?

13:44:25

18 A Yes, I do.

13:44:27

19 Q What did you mean by "fabricated in a
20 package"?

13:44:28

13:44:31

21 A Broadly speaking, what I intended here is
22 an understanding that in the field the term

13:44:41

13:44:47

1 "integrated circuit" has a broad meaning. It may
2 be interpreted differently depending on the
3 context. The -- and I don't describe all
4 potential contexts here.

5 I do state that often in certain contexts
6 that could mean, for example, on a single
7 semiconductor substrate. Some might also consider
8 an integrated circuit on the substrate in general
9 a single substrate.

10 But others also would consider an
11 integrated circuit a circuit that is, you know,
12 integrated potentially with multiple components in
13 a package.

14 You know, for example, even in that time
15 period you may have a package of what most would
16 refer to as an integrated circuit that has some
17 number of pins and that you solder into your
18 circuit board. But you may not know within that
19 package if there is one or two or more substrates
20 that may be not on a single substrate. But within
21 that package they may all be interconnected into a
22 single what many one would call a single chip, for

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13:45:33

13:45:35

13:45:37

13:45:38

13:45:48

13:45:52

13:45:56

13:46:00

13:46:03

13:46:09

13:46:11

1 example. 13:46:16

2 And you would have to look to the data 13:46:18

3 sheet -- or in some cases it may not even fully 13:46:19

4 disclose in the data sheet -- exactly how the -- 13:46:22

5 how the components are -- are connected, for 13:46:26

6 example, within that package. 13:46:30

7 So in the field there would be a variety 13:46:32

8 of understandings of integrated circuit. I don't 13:46:36

9 think there would be any discrepancy on a single 13:46:40

10 silicon substrate, you know, digital circuit in a 13:46:45

11 single package being an integrated circuit, but 13:46:50

12 the term is used more broadly than that alone. 13:46:54

13 Q In your answer you referred to a single 13:46:59

14 chip. Is a single chip -- let me rephrase that. 13:47:07

15 In your answer you referred to a single 13:47:13

16 chip. Would a single chip be interpreted the same 13:47:15

17 way as an integrated circuit? 13:47:21

18 A In many, if not most, scenarios, I 13:47:23

19 believe that would be true. Here what I'm 13:47:25

20 throwing out or when I say "throwing out," what 13:47:27

21 I'm providing and offering, are some of the terms 13:47:30

22 that are used in the art. 13:47:34

1 And in the art when you're asked, or when
2 the person of ordinary skill were considering can
3 this be formed or integrated or provided in an
4 integrated circuit, it could be synonymous with,
5 you know, is this a chip or is this an integrated
6 solution. These would be somewhat synonymous
7 terms in certain circumstances.

13:47:37

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13:48:00

8 The word "chip" is slang, if you will,
9 for a component that would be considered, for
10 example, an integrated circuit.

13:48:02

13:48:07

13:48:12

11 Q And so just to take a look at
12 paragraph -- sorry, the '148 patent, and Claim 13
13 uses the term "integrated circuit."

13:48:14

13:48:22

13:48:25

14 And that's the -- this is the claim that
15 we're discussing in Paragraph 126 of your
16 declaration?

13:48:29

13:48:30

13:48:33

17 A That is correct.

13:48:42

18 Q So in the context -- so your statement
19 that an integrated circuit is simply a circuit
20 that is fabricated in a package, often on a
21 semiconductor substrate, are you describing the
22 term "integrated circuit" in the context of Claim

13:48:43

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13:48:53

13:48:58

13:49:00

1	13 of the '148 patent?	13:49:02
2	A Generally speaking, I believe that I am.	13:49:10
3	Now, I here am also providing, you know,	13:49:13
4	broader understanding. There isn't a lot of	13:49:16
5	additional detail in the '148 patent to further	13:49:20
6	refine what is intended. So I'm applying plain	13:49:22
7	and ordinary meaning for a person of ordinary	13:49:27
8	skill at the time of the invention.	13:49:29
9	You know, within the '148 patent the	13:49:35
10	integrated circuit is mentioned. For example, I	13:49:45
11	believe it's mentioned with regard to the prior	13:49:52
12	art figures. Yeah, I'm sorry. Just give me one	13:49:58
13	moment.	13:50:11
14	So in the context, you know, of the '148,	13:50:14
15	for example in Figure 1, the '148 describes that	13:50:19
16	Figure 1 depicts a typical prior art LED driver.	13:50:25
17	I'm looking at Column 1 of the '148 patent, just	13:50:39
18	for context here, around Line 40, describing	13:50:43
19	Figure 1A as a typical prior art LED driver. And	13:50:46
20	here in that paragraph it states -- meaning the	13:50:51
21	'148 patent states -- that most components of the	13:50:54
22	driver 10 are formed on an integrated circuit	13:50:59

1 chip. The LEDs are typically connected to pins
2 extending from the chip package. And so that's
3 similar terminology to what I was describing.

4 And if you go back and look at Figure 1A
5 as prior art in the box 10, you know, this
6 includes an input voltage, DC voltage regulator,
7 you know, controller, the switching transistor and
8 circuit, as well as a variety of other components
9 such as an output filter capacitor 18 and all the
10 components shown in Figure 1A.

11 So in considering the context in the
12 plain and ordinary meaning of an integrated
13 circuit and an integrated circuit chip, and what
14 would be understood from a person of ordinary
15 skill reading Claim 13 with regard to being formed
16 as an integrated circuit, and what is disclosed in
17 the '148 patent -- and if I recall, very similar
18 term is used referring to Figure 4. This is in
19 Column 5, around Lines 11, 12, and on. That makes
20 a very similar statement, that all circuitry -- in
21 this case it states, Except for inductors, large
22 capacitors, and LEDs, may be formed on the same

13:51:04
13:51:11
13:51:15
13:51:19
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13:51:26
13:51:31
13:51:33
13:51:37
13:51:40
13:51:44
13:51:49
13:51:51
13:51:56
13:52:01
13:52:04
13:52:10
13:52:14
13:52:21
13:52:28
13:52:32
13:52:36

1 integrated circuit.

13:52:39

2 These all seem consistent with the
3 general understanding of what a skilled person
4 might call an integrated circuit or what mean --
5 what they mean by saying that the solution may be
6 realized, or formed in this case, on an integrated
7 circuit or as an integrated circuit.

13:52:46

13:52:49

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13:52:56

13:52:58

13:53:03

8 So in that context, I believe that I was
9 in these statements considering the context of the
10 '148 patent and generally being consistent with
11 what is stated here in the '148 patent.

13:53:07

13:53:11

13:53:14

13:53:17

12 Q Do you agree that Claim 13 refers to the
13 driver of Claim 1?

13:53:25

13:53:28

14 A Yes.

13:53:41

15 Q Do you agree that the -- do you agree
16 that Claim 13 requires all of the elements that
17 are recited in Claim 1 to be formed on an
18 integrated circuit?

13:53:42

13:53:43

13:53:47

13:53:51

19 A It's my understanding that the driver of
20 Claim 1 first must be -- all of the elements of
21 the driver of Claim 1, which include the driver of
22 Claim 1, must be met. Then Claim 13 is a

13:54:28

13:54:37

13:54:44

13:54:46

1 dependent claim on Claim 1, stating that the 13:54:52

2 driver of Claim 1, "wherein the driver is formed 13:54:55

3 as an integrated circuit." 13:54:59

4 Now, there hasn't been any additional 13:55:04

5 construction of what "formed as an integrated 13:55:07

6 circuit" means or should be construed. I 13:55:13

7 recognize this as plain and ordinary meaning to a 13:55:16

8 person of ordinary skill in the art, as I just 13:55:19

9 stated. Also in the context of the '148, as I 13:55:22

10 just described, where I've looked and carefully 13:55:25

11 reviewed what is disclosed, what is described, 13:55:29

12 and, you know, is very similar or identical 13:55:34

13 language used; for example, in reference to Figure 13:55:36

14 1 and Figure 4. 13:55:39

15 And in that context I understand plain 13:55:42

16 and ordinary meaning to include in the scope that 13:55:48

17 some components could be outside of a single 13:55:52

18 package or a single substrate of an integrated 13:55:56

19 circuit and still meet what I understand from 13:56:00

20 plain and ordinary meaning the scope of a driver; 13:56:03

21 including all components of Claim 1, including, 13:56:09

22 for example, the voltage source and all the 13:56:11

1 circuitry required for generating the voltage
2 source.

3 That in the plain and ordinary meaning,
4 the scope could encompass some components that
5 wouldn't reasonably be understood by a skilled
6 person in the context of this type of driver
7 circuit to be in a single substrate or even
8 necessarily in an integrated circuit package.

9 As I stated in the paragraphs you pointed
10 me to on Page 82, for example, I have a Note 4. I
11 also considered the patent owner's infringement
12 contentions, not specific. You know, this wasn't
13 broadly part of my analysis. But, you know -- or
14 not broadly all aspects.

15 But in particular this aspect, I
16 understand that the patent owners, as stated here,
17 contends that the accused televisions each have a
18 driver in which the majority of circuitry is part
19 of an LED driver integrated circuit, or IC.

20 This again is consistent with what
21 outside of those contentions I would have
22 understood from the description in the '148

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13:56:54

13:56:56

13:57:00

13:57:03

13:57:04

13:57:08

13:57:14

13:57:17

13:57:19

13:57:23

13:57:25

13:57:26

1 patent.

13:57:29

2 Q In your answer you said that some
3 components would reasonably be understood by a
4 skilled artisan in the context of this type of
5 driver circuit to be in a single substrate or even
6 necessarily in an integrated circuit package.

13:57:35

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13:57:40

13:57:44

13:57:47

7 When you said "some components," are you
8 referring to limitations that are recited in Claim
9 1?

13:57:50

13:57:53

13:57:56

10 A Yes; to the extent that there are
11 elements in Claim 1, for example, a voltage source
12 that is connected to the LEDs and the circuitry
13 that could be considered as part of that voltage
14 source, which, for example, I believe is what the
15 patent is describing in, for example, Column 5
16 with regard to Figure 4, as well as the -- as an
17 example embodiment that I would presume to be
18 within the context of Claim 1, that there are some
19 components such as inductors, large capacitors,
20 that may be outside of the integrated circuit
21 that's described in Claim 13.

13:57:59

13:58:01

13:58:05

13:58:14

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22 But still indicating that the driver

13:58:51

1 itself is formed as an integrated circuit, that

13:58:53

2 would be my understanding from Claim 13.

13:58:57

3 Q So you mentioned the voltage source

13:59:00

4 that's recited in Claim 1. Is it your opinion

13:59:07

5 that the voltage source of Claim 1 would need to

13:59:10

6 be formed on the integrated circuit that's recited

13:59:14

7 in Claim 13?

13:59:16

8 MS. SWAROOP: Objection to form.

13:59:17

9 A Well, let's be sure I understood the

13:59:25

10 question properly.

13:59:27

11 But as I understand it, Claim 13 is

13:59:28

12 dependent from Claim 1. Claim 1 -- you know, the

13:59:33

13 driver of Claim 1. Claim 1 describes an LED

13:59:39

14 driver. The driver comprising. And one of those

13:59:43

15 elements that the driver comprises is the first

13:59:47

16 element, that is a voltage source for connecting

13:59:49

17 to first ends of LEDs in a plurality of parallel

13:59:52

18 paths.

13:59:57

19 And as an example of that, in Figure 4,

14:00:01

20 with the driver 50 is one example embodiment

14:00:04

21 described in the specification, there is shown the

14:00:09

22 DC voltage regulator 52, the switching transistor

14:00:13

1 and output circuit 54, and the output capacitor 18
2 as examples of circuitry that may be part of a
3 voltage source or connection through the first
4 ends of the LEDs.

5 I believe that is included and
6 encompassed within the driver of Claim 1.

7 Q When you say "I believe that is included
8 and encompassed within the driver of Claim 1,"
9 what are you referring to?

10 A I was referring to the point that there
11 may be components that are part of a voltage
12 source for connecting to the first ends of LEDs in
13 a plurality of parallel paths that may be
14 components that would be understood as not
15 appropriately considered as necessary in an
16 integrated circuit package when considering the
17 terminology of Claim 13 in the context of the '148
18 patent.

19 Q And so which components are not
20 necessary, in your opinion?

21 A I'm not sure I entirely understood the
22 question. I do think I understand what you're

14:00:16

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14:02:03

14:02:06

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14:02:27

14:02:28

14:02:41

1 getting at. But the -- each and every element of
2 Claim 1 is certainly required to meet the
3 requirements of Claim 1, the limitation of Claim
4 1.

5 Claim 13 says the driver of Claim 1
6 wherein the driver is formed as an integrated
7 circuit. It would be my understanding, based on
8 the context of the '148 and the accused products
9 and the contentions associated with them, that the
10 majority of the components would be understood to
11 meet this limitation of "formed as an integrated
12 circuit." And in stating that, I'm simply saying
13 that there may be some components associated with
14 any of those limitations that a skilled person
15 would recognize would not be formed inside, or in
16 this case literally on a silicon substrate, for
17 example, of an integrated circuit, but would still
18 meet the limitation of the driver being formed as
19 an integrated circuit.

20 Q So you referred to "the majority of the
21 components would be understood to meet this
22 limitation of, formed as an integrated circuit."

14:02:43
14:02:46
14:02:48
14:02:52
14:02:53
14:02:56
14:02:58
14:03:02
14:03:12
14:03:15
14:03:20
14:03:24
14:03:28
14:03:30
14:03:33
14:03:39
14:03:43
14:03:46
14:03:48
14:04:01
14:04:03
14:04:04

1	When you refer to "the majority of the	14:04:09
2	components," what components are you referring to?	14:04:10
3	A Components that would be used, for	14:04:16
4	example, in the electrical circuit to meet each of	14:04:17
5	the limitations of Claim 1.	14:04:19
6	Q And so in your opinion, a majority, but	14:04:22
7	not all of the components that are needed to meet	14:04:41
8	Claim 1, would be formed on an integrated circuit	14:04:44
9	in Claim 13.	14:04:49
10	Is that correct?	14:04:50
11	MS. SWAROOP: Objection. Form.	14:04:51
12	A Could you restate the question? I	14:04:56
13	apologize.	14:04:57
14	Q So in your opinion, a majority, but not	14:04:58
15	all of the components that are needed to meet	14:05:04
16	Claim 1, would be formed on an integrated circuit	14:05:07
17	in Claim 13. Correct?	14:05:10
18	MS. SWAROOP: Objection. Objection to	14:05:12
19	form.	14:05:13
20	A I believe that that's generally correct	14:05:17
21	in the context of the '148 patent, understanding	14:05:19
22	the way that the patent has been asserted in the	14:05:24

1 litigation case, broadly forming my opinion of 14:05:28
2 what a person of ordinary skill in the art would 14:05:32
3 recognize as plain and ordinary meaning of being 14:05:33
4 formed as an integrated circuit in the '148 14:05:36
5 patent. 14:05:39

6 I believe what you've stated is correct, 14:05:40
7 that there may be some components that a skilled 14:05:43
8 person would recognize as not having to literally 14:05:47
9 be in the same substrate or package to meet this 14:05:50
10 limitation from the claim elements -- the elements 14:05:53
11 included in Claim 1. 14:05:58

12 And as reference, for example, the types 14:06:04
13 of components that are listed in Column 5, such as 14:06:06
14 inductors and large capacitors. 14:06:10

15 Q Please turn back to the Zane reference, 14:06:14
16 Exhibit 1006, and your declaration at Paragraph 14:07:29
17 182, which is on Page 160. 14:07:37

18 A I am there. 14:08:18

19 Q In Paragraph 182, the second sentence, 14:08:18
20 can you review that second sentence, please? 14:08:25

21 A I have. 14:08:26

22 Q Is it your opinion that the SPDT analog 14:08:47

1	switch in Figure 4 of Zane necessarily includes at	14:08:52
2	least one transistor?	14:08:56
3	A Yes, it is.	14:09:05
4	Q Let's take a look at Paragraph 184.	14:09:05
5	In Paragraph 184 you provide the opinion	14:09:33
6	that it would have been obvious to move the SPDT	14:09:35
7	analog switch of Zane from the noninverting input	14:09:39
8	of the op amp to a location between the output of	14:09:44
9	the op amp and the current control transistor Q.	14:09:49
10	Do you see that?	14:09:51
11	A Yes, I do.	14:09:53
12	Q And you are familiar with the obviousness	14:09:53
13	rationales in patent law. Correct? I believe you	14:09:58
14	refer to some of them in Paragraph 27 of your	14:10:02
15	declaration.	14:10:04
16	A That is correct.	14:10:08
17	Q And the motivation that you provide in	14:10:09
18	Paragraphs 85 and 86 of your declaration for	14:10:16
19	making the modification is that it would have been	14:10:20
20	obvious to try. Correct?	14:10:22
21	MS. SWAROOP: Objection to form.	14:10:30
22	A Just to clarify here, I believe you said	14:10:56

1 Paragraphs 185 and 186?

14:10:58

2 Q Yes, that's correct. But certainly, I
3 mean, look at paragraph -- look at the whole
4 section, Limitation 5.1, Paragraphs 182 through
5 186, and let me know if you've provided any
6 obviousness rationales other than, obvious to try?

14:11:02

14:11:07

14:11:08

14:11:15

14:11:18

7 A Generally speaking, I believe you're
8 correct. But just to be sure I'm clear, as I've
9 described, and I believe as you pointed out, I
10 state that the actual location of the switch in
11 the circuit is a simple design choice. It's --
12 I'm referring back to Paragraph 27, where I've
13 already stated different rationales. This was a
14 design choice choosing from a finite number of
15 identified predictable solutions with, you know,
16 predictable expectation of success. It's also
17 related to a predictable use, so -- of elements,
18 according to their established function.

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14:13:56

14:14:04

19 So as I've described here, the desired
20 function, which was well known and I believe also
21 generally indicated as a known function, including
22 for example, I believe I've -- I believe that the

14:14:07

14:14:11

14:14:16

14:14:23

1 Zane article refers to at least two examples of 14:14:28
2 commercial integrated circuits that were available 14:14:37
3 at the time that provided this type of parallel 14:14:39
4 path with current regulation, multiple parallel 14:14:45
5 paths of LEDs as an integrated circuit, and that 14:14:50
6 provide them with a controllable on/off, 14:14:52
7 enable/disable type behavior of that current 14:14:58
8 source, or of that current set circuit. 14:15:00

9 So the function was very well known. The 14:15:06
10 purpose was well known. There were many products 14:15:10
11 that were available and known at this time. And 14:15:12
12 so the motivation for the change, the move that 14:15:16
13 I've shown here, is that this was a finite set of 14:15:22
14 options of locating a switch. And it would have 14:15:28
15 been easily known that any location in this path, 14:15:33
16 either in this case in Figure 4 of the Zane 14:15:38
17 article, enabling or disabling the reference 14:15:43
18 point, would be seen as roughly equivalent to 14:15:46
19 enabling or disabling that same regulator circuit 14:15:49
20 at any point that would enable or disable its 14:15:56
21 operation in this path. 14:15:59

22 So I believe your question was the 14:16:01

1 motivation to try the only motivation that I've 14:16:03
2 included here? I just want to be sure it's clear 14:16:07
3 that I understand this to be a design choice among 14:16:12
4 a finite number of options that a skilled person 14:16:16
5 would have already known, and that the result 14:16:19
6 would be predictable in any of these options 14:16:22
7 because they're all commonly used in the field, 14:16:25
8 enabling or disabling the reference, enabling or 14:16:29
9 disabling the output of the amplifier, or even 14:16:33
10 just disrupting the current itself in the -- in 14:16:37
11 the power path of the transistor Q in Figure 4. 14:16:41
12 These were all known options. This was a simple 14:16:49
13 design choice among that finite set of options. 14:16:52

14 And the motivation would be either to try 14:16:56
15 or I think what I've really stated is, a group of 14:16:59
16 skilled individuals at the time of the invention 14:17:04
17 would likely simply have chosen different one of 14:17:08
18 these options each. So because these were all a 14:17:12
19 known set that they were choosing from with the 14:17:17
20 same result, using the same components. 14:17:18

21 Q Let me try to unpackage some of that. 14:17:23

22 So you mentioned several times there that 14:17:30

1	there were a finite number of defined identifiable	14:17:32
2	predictable solutions. Correct?	14:17:36
3	A I did, yes.	14:17:38
4	Q How many solutions are there?	14:17:39
5	A Specific to the circuit of Figure 4.	14:17:47
6	Q Correct.	14:17:49
7	A I believe that I have stated options here	14:17:50
8	in my declaration.	14:17:54
9	And in Paragraph 186 -- and I may have	14:17:59
10	referred to this briefly in relation to the same	14:18:09
11	client in the previous paragraphs -- I'm referring	14:18:14
12	to, for example, three places as example, while I	14:18:16
13	may have inferred a fourth.	14:18:21
14	Referring to Figure 4, for example, that	14:18:22
15	would be at the noninverting input of the op amp,	14:18:23
16	where it's already included in Figure 4. It would	14:18:30
17	be at the output of the op amp between the	14:18:32
18	operational amplifier and the control transistor Q	14:18:33
19	to disable the feedback at that point. It would	14:18:35
20	be at the emitter of the transistor Q before the	14:18:40
21	resistor RS, which would -- what I just stated as	14:18:46
22	being part of the power path. I believe these are	14:18:50

1 the three options that I've shown here.

14:18:56

2 Similarly -- and I don't recall if I
3 stated it here, I think it's certainly
4 indicated -- anywhere in this feedback path could
5 be used to enable or disable with a switch that
6 feedback regulation. And that would also include,
7 for example, the inverting input of the op amp,
8 could also be used as a way to enable and disable
9 that feedback function.

14:18:58

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10 But the finite options are just
11 recognizing simply we have a finite number of
12 components here. The purpose is well known; that
13 the goal here and desired intent, which was
14 admitted both in the Zane article as well as the
15 other references in this matter, is to enable and
16 disable this current sink as is described in
17 Figure 4, as simply requires that a switch is used
18 to turn on and turn off the capability of that
19 current sink.

14:19:21

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20 And as I just described, there are a
21 finite number of options that would have been well
22 known and commonly used for enabling and disabling

14:19:51

14:19:53

14:19:56

1 that current sink with the transistor.

14:20:00

2 Q Would the circuit that's shown in Figure
3 4 operate the same, based on all those different
4 options? Let me rephrase that question.

14:20:01

14:20:04

14:20:09

5 Would the circuit that's shown in Figure
6 4 operate the same, based on the four solutions
7 that you just identified?

14:20:11

14:20:13

14:20:17

8 MS. SWAROOP: Objection to form.

14:20:23

9 A Roughly speaking. Now, of course, any
10 change in circuit has, you know, some change in
11 effect. But a skilled person would recognize that
12 each of those options as I've described them would
13 have the same, you know, effect, would achieve the
14 same goal.

14:20:24

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14:20:39

15 And that is simply that without the
16 switch, the PWM control switch applied, this
17 circuit acts as a current sink. And it would
18 maintain the current, to the extent that it's
19 capable, to that parallel path through the
20 series-connected LEDs.

14:20:40

14:20:42

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14:20:57

21 Now, we add one or more switches, the
22 purpose is to disable that path so that we get the

14:20:58

14:21:01

1 pulse width modulated output response for the 14:21:06
2 current in the LED. 14:21:11

3 So in each of those options that I've 14:21:12
4 described, we applied one or more switches. We 14:21:15
5 disconnect or disrupt the current sink behavior. 14:21:18
6 And they all result in the same result, the same 14:21:23
7 behavior, which is, when enabled, it is the 14:21:28
8 current sink circuit as designed. When the 14:21:32
9 transistor disrupts the behavior, the current goes 14:21:34
10 to zero in the LED. They would all have that same 14:21:38
11 result. 14:21:43

12 Q So they would have the same result, but 14:21:56
13 they wouldn't necessarily perform the same. 14:21:57

14 Is that correct? 14:21:59

15 A I'm not sure exactly what's being 14:22:02
16 indicated here. They would all achieve the same 14:22:04
17 result. They would do it essentially in the same 14:22:08
18 way, using the current sink circuit shown in 14:22:11
19 Figure 4, with one or more transistors, to enable 14:22:14
20 or disable that circuit by disconnecting or 14:22:18
21 disrupting any of the paths in that circuit. 14:22:23

22 And they would all behave in that same 14:22:26

1 way, as, you know, an electrical circuit. Meaning 14:22:29
2 when the switch is in an appropriate position, the 14:22:33
3 circuit would be identical, essentially. And when 14:22:36
4 the switch is in a position -- switch meaning, you 14:22:42
5 know, one or more transistors are in an 14:22:45
6 appropriate position to disrupt that path -- then 14:22:48
7 the current through the transistor Q and the 14:22:52
8 current in the LED would go up to zero. Those are 14:22:57
9 all the same. 14:23:00

10 There could be differences on what the 14:23:02
11 internal voltage or current may be at a given 14:23:06
12 point within that circuit, but that would be 14:23:08
13 inconsequential. It would achieve the same 14:23:11
14 circuit purpose. 14:23:13

15 And maybe just to clarify. In all 14:23:25
16 options the result would be that the base of the 14:23:27
17 transistor Q was brought to an appropriate voltage 14:23:32
18 and current, such that the transistor Q in Figure 14:23:35
19 4 is off when the PWM circuit is desired to be 14:23:38
20 off; and it would be on, or enabled and 14:23:44
21 regulating, when it's intended to be on. 14:23:47

22 Q I believe you mentioned one of the 14:23:50

1	locations that you could move the switch to is	14:24:25
2	between the transistor Q and the sense resistor	14:24:27
3	RS.	14:24:34
4	Is that correct, or did I misunderstand?	14:24:34
5	A I did state that that was one of the	14:24:51
6	options.	14:24:53
7	Q Okay. So if you moved it to that	14:24:53
8	location, then what you just said wouldn't	14:24:58
9	necessarily be true. Right? The base of the	14:25:00
10	transistor Q could be brought to an appropriate --	14:25:02
11	my apologies. Let me try that again. So I'm	14:25:12
12	going to start over that line of questioning	14:25:40
13	again.	14:25:42
14	So you mentioned that one of the	14:25:42
15	locations that you could move the switch to is	14:25:44
16	between the transistor Q and the sense resistor	14:25:46
17	RS. Right?	14:25:50
18	A The one or more switches, that's correct.	14:25:54
19	The one or more transistors associated with a	14:25:56
20	switch.	14:25:58
21	Q And if you moved the switch to that	14:26:01
22	location, it would not affect the voltage that is	14:26:05

1 being provided to the base of transistor Q.

14:26:12

2 Is that correct?

14:26:16

3 A If we, you know, include the switch or
4 switches in this location, you know, there are a
5 variety of ways that this could be done. But in
6 any way that we do so, it would have an impact on
7 the transistor Q.

14:26:23

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14:26:34

14:26:37

8 And this impact would ultimately impact
9 the entire feedback loop and would impact both
10 the -- ultimately the end base voltage, the
11 emitter voltage, the effective base to emitter
12 voltage of Q, which determines its operation and,
13 of course, the resulting current in the base to
14 emitter of Q.

14:26:43

14:26:45

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14:27:02

15 There are a variety of reasons that this
16 would not be as desirable a location as any of the
17 other locations we mentioned, but it is a
18 potential location to be considered.

14:27:13

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14:27:23

19 The reason it would be less desirable is,
20 you know, then that transistor would also have to
21 be rated for the power flow through that circuit.

14:27:25

14:27:28

14:27:30

22 Q Is there a reason -- take a look at Page

14:27:36

1 118 of your declaration. You show the move that
2 you're suggesting, to move the switch from the
3 noninverting pin of the op amp to a location
4 between the output of the op amp and the base of
5 the transistor Q. Right?

6 A Yes.

7 Q Is there any reason that that move would
8 be less desirable than the circuit that's shown in
9 Figure 4?

10 A It really depends on context.

11 You know, at this point it depends on
12 the -- you know, the voltages and power supplies
13 in each of the circuits, the selection of the
14 operational amplifier and its natural behavior.

15 But these are the -- you know, of the
16 four, for example, that we've mentioned, these
17 were the two that I've most commonly seen. And
18 would generally expect a circuit designer, person
19 of ordinary skill at that time, to have considered
20 either of these two, the current location or the
21 location I've indicated as the move. And I
22 believe I've given an additional reference.

1 You know, Chang is just one more example
2 as a reference that in that case is using a
3 particular type of operational amplifier where
4 it's convenient to move the switch to the location
5 of the output of the op amp and, you know, disable
6 the op amp essentially by applying the switch
7 there. In that case using the switch to shunt the
8 output of the op amp away from the transistor Q.

14:28:40
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14:28:57
14:29:02

9 So, you know, in a given situation, as we
10 look at the voltages of the power supplies, the
11 voltages of the transistors, the, you know,
12 components available and at hand for the skilled
13 person, all of these would have an impact on the
14 final -- you know, on the decision which of the
15 two, for example, locations that would be most
16 common, these two that we just described, to
17 choose from.

14:29:06
14:29:10
14:29:12
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14:29:34

18 Q You just mentioned the Chang reference,
19 which I believe is Exhibit 1027. You mention it
20 at Footnote 8 on Page 119 of your declaration.

14:29:39
14:29:41
14:29:45

21 Is that the Chang reference that you're
22 referring to?

14:29:48
14:29:50

1	A	That is correct. In Footnote 8 on Page	14:29:51
2		119.	14:29:53
3	Q	Did you rely on Chang in your grounds of	14:29:56
4		unpatentability?	14:30:01
5	A	No, I did not. I just mention it here as	14:30:02
6		another example that it was known at the time.	14:30:04
7		The skilled person has seen and recognized and	14:30:09
8		understood examples. But no, I didn't refer to	14:30:12
9		that as a part of this combination, as I've	14:30:14
10		stated.	14:30:19
11		I understand that a skilled person would	14:30:19
12		know that these multiple options I've described	14:30:21
13		would be available and understood. And especially	14:30:24
14		these two options that we were just emphasizing,	14:30:29
15		would be well known. And the considerations I	14:30:31
16		just walked through would help determine which	14:30:35
17		would be an appropriate place to place the switch.	14:30:37
18	Q	I see.	14:30:46
19	MR. BEMBEN:	If you allow me to consult	14:30:47
20		with my colleagues.	14:30:49
21		Can we go off the record, please, Debbie?	14:30:50
22		Thank you.	14:30:52

Transcript of Regan A. Zane, Ph.D.
Conducted on May 14, 2024

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1	(A discussion was held off the record.)	14:31:02
2	VIDEO SPECIALIST: We are going off the	14:31:02
3	record at 2:31 p.m.	14:31:03
4	(A recess was taken.)	14:31:06
5	VIDEO SPECIALIST: We are back on the	14:38:32
6	record at 2:38 p.m.	14:38:39
7	MR. BEMBEN: Thank you.	14:38:43
8	And thank you for your time today,	14:38:44
9	Dr. Zane. I have no further questions. I'll pass	14:38:45
10	the witness to Ms. Swaroop.	14:38:49
11	MS. SWAROOP: Thank you. At this time	14:38:52
12	petitioner has no questions for Dr. Zane, so we	14:38:53
13	can conclude today's deposition.	14:38:56
14	VIDEO SPECIALIST: This marks the end of	14:38:59
15	the deposition of Dr. Regan Zane. We're going off	14:39:04
16	the record at 2:39 p.m. eastern time.	14:39:07
17	(Off the record at 2:39 p.m. EDT.)	

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22

ACKNOWLEDGMENT OF DEPONENT

I, REGAN A. ZANE, Ph.D., do hereby
acknowledge that I have read and examined the
foregoing testimony, and the same is a true,
correct and complete transcription of the
testimony given by me, and any corrections appear
on the attached Errata sheet signed by me.

(DATE)

(SIGNATURE)

C E R T I F I C A T E

I, Debra Ann Whitehead, E-Notary Public in and for
the State of Maryland, do hereby certify:

That REGAN A. ZANE, Ph.D., the witness
whose deposition is hereinbefore set forth, was duly
sworn by me before the commencement of such
deposition and that such deposition was taken
virtually and is a true record of the testimony
given by such witness.

I further certify that the adverse party,
VIZIO, INC., was represented by counsel at the
deposition.

I further certify that the deposition of
REGAN A. ZANE, Ph.D., occurred virtually, on
Tuesday, May 14th, 2024, from 11:09 a.m. to 2:39
p.m. EDT.

1 I further certify that I am not related to
2 any of the parties to this action by blood or
3 marriage, I am not employed by or an attorney to any
4 of the parties to this action, and that I am in no
5 way interested, financially or otherwise, in the
6 outcome of this matter.

7
8 IN WITNESS WHEREOF, I have hereunto set my
9 hand this 24th day of May, 2024.

10
11 My commission expires:

12 April 30th, 2027

13 A circular notary seal for the State of Maryland, featuring the text "NOTARY PUBLIC" and "STATE OF MARYLAND" around a central emblem.

14 Regan A. Zane

15 -----
16 E-NOTARY PUBLIC IN AND FOR THE
17 STATE OF MARYLAND
18
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