1 UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
2
3 _____)
4 SAMSUNG ELECTRONICS)
CO., LTD. and SAMSUNG)
5 ELECTRONICS AMERICA,)
INC.,)
6) Case IPR2023-00992
Petitioners,) U.S. Patent No.
7) 9,369,081
vs.)
8) Case IPR2023-00993
RESONANT SYSTEMS,) 9,941,830
9 INC.,)
)
10 Patent Owner.)
_____)
11
12
13
14 The virtual deposition of KEITH W. GOOSSEN,
15 Ph.D., called by the Petitioners for examination,
16 pursuant to Notice, and pursuant to the Rules of
17 Procedure for the United States Patent and Trademark
18 Office, taken stenographically by Sandra L. Rocca,
19 CSR, RPR, RMR, CRR, via Zoom, on the 3rd of July,
20 2024, at the hour of 10:04 a.m.
21
22
23
24 Certification No. 084-003435, 1245
25 5104-4011-7213-5936

Samsung et al. v. Resonant Sys.
IPR2023-00993 - Exhibit 1048

1 A P P E A R A N C E S: (All parties appeared remotely)
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19 Patent Owner.
20
21 * * * * *
22
23
24
25

1 I N D E X

2 WITNESS PAGE

3 KEITH W. GOOSSEN, Ph.D.

4 EXAMINED BY

5 Mr. Miller 5

6 * * * * *

7 E X H I B I T S

8 NUMBER MARKED FOR ID

9 Petitioner's

10 Exhibit 1046 Wikipedia entry for H-bridge 68

11 PRESENTED

12 Exhibit 1001 U.S. Patent 9,369,081 29

13 Exhibit 1001 U.S. Patent 9,941,830 46

14 Exhibit 1003 A. Wolfe Declaration in IPR2023-00992 14

15

Exhibit 1003 A. Wolfe Declaration in

16 IPR2023-00993 36

17 Exhibit 1005 U.S. Patent No. 7,292,227 (Fukumoto) 39

18

Exhibit 1008 U.S. Patent Application

19 Publication 2004/0169480 A1 (Ueda) 75

20

Exhibit 1015 Japanese Unexamined Patent

21 Application Publication JP H8-196053 (Ogusu) 101

22

Exhibit 1037 Exar Databook 50

23

Exhibit 1039 "The Art of Electronics"

24 Horowitz and Hill 52

25

1 E X H I B I T S
(con't)

2 NUMBER		PRESENTED
3 Petitioner's		
4 Exhibit 1042	ST Duel Full-Bridge Driver L298	51
5		
6 Patent Owner		
7 Exhibit 2008	K. Goossen Declaration	10
8 Exhibit 2009	K. Goossen CV	6
9		
10 Institution Decision re IPR2023-00992		25
11 Institution Decision re IPR2023-00993		25
12		

13 (Only newly marked Exhibit 1046 is attached)
14
15 * * * * *
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09:58:54 1 KEITH W. GOOSSEN, Ph.D.,
09:58:54 2 having been first duly sworn, was examined and
09:58:54 3 testified as follows:
09:58:54 4 CROSS EXAMINATION
09:58:54 5 BY MR. MILLER:
10:04:19 6 Q Good morning, Dr. Goossen. How are you
10:04:24 7 today?
10:04:24 8 A I'm good. Thank you.
10:04:26 9 Q Good. My name's Jeffrey Miller, a lawyer at
10:04:30 10 Arnold & Porter Kay Scholer and I will be taking
10:04:33 11 your deposition today in two different IPR
10:04:38 12 proceedings and just for the record, those are
10:04:41 13 IPR2023-00992 and IPR2023-00993.
10:04:53 14 And before we get into the substance, I just
10:04:58 15 want to get a few ground rules in which, based on
10:05:02 16 looking at your CV, I think you're probably familiar
10:05:05 17 with. But just so the record is clear, I take it
10:05:08 18 you've given a deposition or two before in your
10:05:10 19 lifetime?
10:05:10 20 A Yes.
10:05:11 21 Q Approximately how many?
10:05:13 22 A I think between 15 and 20 at this point.
10:05:18 23 Q Have those all been in the context of acting
10:05:22 24 as an expert witness?
10:05:24 25 A No. One was not.

10:05:25 1 Q Was the one a patent case?
10:05:27 2 A No, it was not. It was a faculty dispute
10:05:32 3 with the University of Delaware.
10:05:33 4 Q Okay. So you were a fact witness there?
10:05:36 5 A Yes.
10:05:37 6 Q Thank you. In the 15 or so depositions that
10:05:43 7 you've given as an expert, were those all in patent
10:05:45 8 cases?
10:05:47 9 A Yes.
10:05:47 10 Q I looked over your CV, which is
10:05:56 11 Exhibit 2009, it looks like you've given -- at least
10:06:00 12 you've been an expert in a number of cases. It
10:06:06 13 looks like, from what I can tell, most of those
10:06:09 14 cases involved optical networking of some form or
10:06:12 15 another. Is that right?
10:06:13 16 A Not all of them, no.
10:06:13 17 (Document marked previously as
10:06:13 18 Exhibit 2009 was presented.)
10:06:15 19 BY MR. MILLER:
10:06:15 20 Q So why don't you pull down Exhibit 2009 and
10:06:19 21 let me know which of the cases did not involve
10:06:22 22 optical networking?
10:06:24 23 A So the University of Michigan versus Leica.
10:06:47 24 Q What did that one involve?
10:06:49 25 A That one involved microscopy. The '858 case

10:07:04 1 involved teleconference networking, and the SVV case
10:07:14 2 involved display technology.
10:07:24 3 Q Did any of these prior engagements involve
10:07:31 4 motors similar to those that are involved in the
10:07:34 5 present IPR proceedings?
10:07:36 6 A I'm trying to think. Actually I think one's
10:07:42 7 not listed there that involved electric power.
10:07:45 8 Q Do you remember what the name of that case
10:07:47 9 was?
10:07:47 10 A I apologize. I don't. I could look it up.
10:07:58 11 Q Okay. Thanks. Now, you're currently a
10:08:02 12 professor at the University of Delaware, right?
10:08:04 13 A Yes.
10:08:05 14 Q And where do you spend most of your -- let
10:08:10 15 me start again.
10:08:11 16 In your work as a professor at the
10:08:14 17 University of Delaware, what's the focus of your
10:08:17 18 research?
10:08:19 19 A Currently it's primarily in the field of
10:08:23 20 energy systems and electric power.
10:08:25 21 Q Can you give us a very, very high overview
10:08:31 22 of what you mean by energy systems?
10:08:32 23 A Well, it's primarily in the field of energy
10:08:37 24 efficiency which involves determining methods and
10:08:44 25 techniques for operating systems with higher -- with

10:08:48 1 lower energy use for the same output.
10:08:52 2 Q You wanted to put -- at least from what I
10:09:10 3 could tell, you wanted to tell me what you're doing
10:09:13 4 present.
10:09:14 5 Before your research was focused on energy
10:09:17 6 systems, where was your research focused?
10:09:22 7 A Well, in optics generally.
10:09:25 8 Q Does your current research into energy
10:09:28 9 systems relate to optics?
10:09:30 10 A Some does, but not all.
10:09:32 11 Q How would it relate to optics?
10:09:36 12 A Right now I have a project in what's called
10:09:42 13 smart glass technology for controlling solar loads
10:09:47 14 on buildings.
10:09:48 15 Q As of you know, currently, are you doing any
10:10:11 16 consulting outside of your work at the University of
10:10:15 17 Delaware that is not acting as an expert witness?
10:10:21 18 A Yes.
10:10:21 19 Q Can you tell me about those engagements?
10:10:26 20 A Currently there's just one of those
10:10:30 21 engagements. It has to do with semiconductor
10:10:41 22 processing.
10:10:41 23 Q At a very high level, can you tell me what
10:10:43 24 that's about?
10:10:43 25 A No.

10:10:44 1 Q Is that because you have an NDA?
10:10:46 2 A Yes.
10:10:47 3 Q Can you tell us who it's with?
10:10:49 4 A No.
10:10:50 5 Q Okay. I promised to get through some ground
10:11:12 6 rules here. Given that you've given depositions
10:11:14 7 before, I'm assuming you know this, but it's
10:11:19 8 important that in response to my questions that you
10:11:22 9 give an oral answer. Is that okay?
10:11:24 10 A Yes.
10:11:25 11 Q Shaking your head yes or no, our court
10:11:30 12 reporter Sandra, is terrific, but she's not going to
10:11:34 13 be able to record that.
10:11:35 14 A I'm sorry. Have I done that?
10:11:37 15 Q No, you haven't. I'm --
10:11:39 16 A Okay.
10:11:40 17 Q I can promise you at some point that either
10:11:42 18 you or I will violate some of these rules. Probably
10:11:45 19 me actually. But anyway. So that's the first
10:11:49 20 general rule.
10:11:49 21 Second general rule is that we need to try
10:11:51 22 to avoid speaking over each other. The court
10:11:55 23 reporter can only take down one speaker at a time.
10:11:58 24 And if we are both speaking, she can't get down
10:12:00 25 either of us. Is that okay?

10:12:02 1 A Yes.
10:12:03 2 Q And your counsel may make some objections
10:12:09 3 today. I'm assuming he will at some point. Those
10:12:14 4 objections are for the record and you understand
10:12:17 5 that unless your counsel instructs you not to
10:12:21 6 answer, you're going to have to answer the question
10:12:23 7 as best you can, right? You understand that?
10:12:26 8 A Yes.
10:12:26 9 Q And you understand that every word spoken
10:12:34 10 while we're on the record today will be taken down
10:12:37 11 by the stenographer?
10:12:38 12 A Yes.
10:12:39 13 Q And you understand that your testimony today
10:12:43 14 has the same import as if given in a court of law or
10:12:51 15 a courtroom within the United States Patent and
10:13:01 16 Trademark Office?
10:13:01 17 A Yes.
10:13:02 18 Q Great. Okay. So I'd like to -- if you
10:13:08 19 could pull out your declaration which has been
10:13:10 20 marked as Exhibit 2008.
10:13:10 21 (Document marked previously as
10:13:19 22 Exhibit 2008 was presented.)
10:13:19 23 A I have it.
10:13:21 24 Q Great. Are you working off a hard copy or
10:13:24 25 the soft copy that I've given you?

10:13:26 1 A The soft copy you gave me.
10:13:27 2 Q Great. If you could turn, please, to
10:13:33 3 page 23. And this is page 23 of your declaration.
10:13:38 4 I don't actually know what page it is in the PDF,
10:13:41 5 but the heading is "Claim Construction."
10:13:45 6 A Yes.
10:13:45 7 Q Let me know when you get there.
10:13:49 8 A I'm there.
10:13:49 9 Q You've provided some of your opinions, I
10:13:58 10 think it was three claim terms, is that right?
10:14:01 11 A Yes.
10:14:01 12 Q One of the terms at issue in this case --
10:14:06 13 well, I shouldn't say that. But one of the claim
10:14:08 14 terms is the term "power supply." Do you remember
10:14:11 15 that?
10:14:11 16 A Power supply is a claim term, yes.
10:14:14 17 Q I didn't see where you provided any
10:14:18 18 construction for that term. Did I miss that?
10:14:24 19 A I was not asked to.
10:14:26 20 Q Okay. So the answer to my question is that
10:14:29 21 you did not provide a construction for the claim
10:14:32 22 term "power supply," right?
10:14:33 23 A Well, the power supply is further specified
10:14:42 24 from the claim based upon the construction of
10:14:45 25 control component.

10:14:47 1 Q Okay. Putting aside control component,
10:14:49 2 we'll get into that in a moment, but in terms of the
10:14:52 3 term power supply, you didn't provide any definition
10:14:55 4 of that term in your declaration, did you?
10:14:57 5 A Only inasmuch as when control component is
10:15:05 6 construed that results in an effect on the claim
10:15:11 7 term power supply.
10:15:12 8 Q I understand. But in terms of -- you didn't
10:15:15 9 say, in my opinion, a person having an ordinary
10:15:19 10 skill in the art would understand that a power
10:15:24 11 supply it should be construed as X, Y and Z,
10:15:28 12 correct?
10:15:28 13 A Only inasmuch as the statements I make when
10:15:32 14 control component is construed.
10:15:35 15 Q Okay. So why don't we talk about control
10:15:39 16 component for a moment. In your declaration, at
10:15:44 17 paragraphs 62 through 66, you assert -- and I'm
10:15:53 18 looking at paragraph 62 -- you state that "In my
10:16:01 19 opinion, the control component limitations in the
10:16:04 20 '081 and '830 patent claims each specify a function"
10:16:12 21 -- hello? I got some gray on the line. Was someone
10:16:17 22 speaking?
10:16:19 23 Okay. Let me start again. In paragraph 62
10:16:22 24 of your declaration, you state, "In my opinion, the
10:16:26 25 control component limitations in the '081 and '830

10:16:32 1 patent claims each specify a function without
10:16:35 2 reciting structure sufficient for performing that
10:16:38 3 function."
10:16:39 4 Do you see that?
10:16:40 5 A Yes.
10:16:40 6 Q And then you go on and you state, "For
10:16:47 7 example, these limitations do not recite elements
10:16:52 8 that a POSITA would recognize as a structure for
10:16:55 9 performing a recited function, such as a
10:16:58 10 microprocessor."
10:16:59 11 Do you see that?
10:16:59 12 A Yes.
10:17:00 13 Q And then because of these two sentences that
10:17:08 14 you have in your declaration at paragraph 62, you
10:17:12 15 assert that the control component element should be
10:17:15 16 construed as a means-plus-function element under
10:17:19 17 35 U.S.C. Section 112(f), correct?
10:17:22 18 A Yes.
10:17:22 19 Q And it's true that all of your analysis
10:17:35 20 where you rebut Dr. Wolfe is based on the
10:17:39 21 means-plus-function construction, at least as it
10:17:42 22 applies to the control component claim term,
10:17:45 23 correct?
10:17:47 24 A My rebuttal of Dr. Wolfe was based upon his
10:17:53 25 analysis which was of the terms having a

10:17:57 1 means-plus-function.
10:18:03 2 Q It's true -- and I think I gave you both of
10:18:08 3 Dr. Wolff's declarations in this case. He provides
10:18:13 4 testimony regarding the control component claim term
10:18:17 5 as it's applied to the prior art under both a
10:18:21 6 means-plus-function construction and a
10:18:23 7 non-means-plus-function construction, correct?
10:18:28 8 A Can you point me to the particular passage?
10:18:28 9 (Document marked previously as
10:18:28 10 Exhibit 1003 was presented.)
10:18:33 11 BY MR. MILLER:
10:18:33 12 Q Sure. Why don't we just focus for now on
10:18:36 13 the '992 proceeding which relates to the U.S.
10:18:42 14 Patent 9,369,081 and this would be Exhibit 1003.
10:18:49 15 Let me know when you've had a chance to open it.
10:19:00 16 A Yes, I have it.
10:19:01 17 Q Great. And if you could go to paragraph 176
10:19:08 18 of his declaration in the '992 proceeding.
10:19:24 19 A 176, yes.
10:19:25 20 Q It's on page 90 of the substantive portion.
10:19:31 21 I don't know what page it is in the PDF.
10:19:34 22 A Page 95 is what I have.
10:19:36 23 Q Okay, great. So if you look at
10:19:40 24 paragraph 176 of Dr. Wolfe's declaration, he states
10:19:43 25 that "It is my opinion that Fukumoto discloses or

10:19:47 1 suggests this limitation under a non-MPF or MPF
10:19:51 2 construction."
10:19:52 3 Do you see that?
10:19:56 4 A I'm not sure if we're looking at the same --
10:20:01 5 Q Are you looking at --
10:20:03 6 A I'm looking at Ex 1003. Is that correct?
10:20:07 7 Q Yeah, are you looking in the -- in his
10:20:11 8 declaration for the '992 proceeding or for the '993?
10:20:16 9 A I'm looking at Ex 1003.
10:20:21 10 Q I understand. There's actually two Ex
10:20:24 11 1003s.
10:20:24 12 A There's two of them. I'm sorry.
10:20:25 13 Q Just so the record is clear, there's two
10:20:28 14 proceedings that we're deposing you under today, the
10:20:31 15 '992 proceeding and the '993 proceeding. And there
10:20:36 16 is some overlap with the exhibit numbering, but the
10:20:41 17 Board requires that the exhibits be filed
10:20:43 18 individually in each and Dr. Wolfe put together two
10:20:46 19 separate declarations. You have one declaration
10:20:48 20 that went into both.
10:20:50 21 A Okay. So I see two -- in the chat I see two
10:20:59 22 documents labeled Ex 1003.
10:21:02 23 Q Yes.
10:21:06 24 A Okay. I think -- I had been on the second
10:21:11 25 one. Okay, let me go to 176 now. Okay.

10:21:27 1 Q So in paragraph 176 of Dr. Wolfe's
10:21:32 2 declaration in the '992 proceeding, he states that
10:21:36 3 "It is my opinion that Fukumoto discloses or
10:21:38 4 suggests this limitation under a non-MPF or MPF
10:21:43 5 construction."
10:21:44 6 Do you see that?
10:21:47 7 A I see that there, yes.
10:21:48 8 Q And if you continue through -- we don't need
10:21:53 9 to read the whole thing, the whole portion at least
10:21:56 10 yet -- but in paragraphs 176, 177, 178, there
10:22:14 11 Dr. Wolfe is explaining his opinions as to how the
10:22:17 12 Fukumoto reference discloses a control component
10:22:25 13 recited in claim 1 of the '081 patent under a
10:22:29 14 non-means-plus-function construction.
10:22:32 15 Do you see that?
10:22:33 16 A What passage are you pointing me to
10:22:35 17 particularly?
10:22:36 18 Q 176, 177, and 178.
10:22:45 19 A Okay. Perhaps you'll have to explain it to
10:22:47 20 me because 177 refers to CPU-driven events which
10:22:54 21 would be under the means-plus-function definition, I
10:22:57 22 believe.
10:22:59 23 Q Well, actually I don't agree with you there.
10:23:02 24 But if you look at paragraph 179 --
10:23:05 25 A Okay.

10:23:13 1 Q -- it continues into paragraph 180, 181,
10:23:17 2 182.
10:23:19 3 A Okay. 179.
10:23:23 4 Q There he talks about some
10:23:25 5 means-plus-function -- let me start again.
10:23:28 6 In paragraph 179, Dr. Wolfe's talking
10:23:31 7 about --
10:23:32 8 A Means-plus-function.
10:23:33 9 Q -- means-plus-function, or MPF I believe is
10:23:36 10 the word he used. Do you see that?
10:23:38 11 A Yes.
10:23:39 12 Q So does that help you to understand that
10:23:44 13 Dr. Wolfe provided his opinions under both a
10:23:48 14 non-means-plus-function and a means-plus-function
10:23:50 15 construction for the term "control component"?
10:23:54 16 A No.
10:23:57 17 Q Let me ask you this. Did you only analyze
10:24:02 18 how the prior art read onto the claim term "control
10:24:10 19 component" based on a means-plus-function
10:24:14 20 construction for that term?
10:24:17 21 A So I only saw a means-plus-function analysis
10:24:24 22 by Dr. Wolfe.
10:24:27 23 Q Okay. So the answer to my question then is
10:24:31 24 yes, you only analyzed the claim under a
10:24:34 25 means-plus-function construction, right?

10:24:37 1 A Let me -- okay. So I knew this was going to
10:24:41 2 be a difficult case for me because I'm not a lawyer.
10:24:46 3 When you say not a means-plus-function, you mean
10:24:50 4 just in terms of what is written in the claim itself
10:24:55 5 without any other input? Is that what you're
10:24:58 6 saying?
10:24:58 7 Q Well, if you look at your -- let's pull out
10:25:04 8 your declaration.
10:25:11 9 A Okay. I'm sorry. You want me to bring up
10:25:13 10 my declaration?
10:25:14 11 Q Yeah.
10:25:18 12 A Okay.
10:25:19 13 Q If you look at -- go to paragraph 33 and 34
10:25:33 14 for that matter. Here you provide your
10:25:36 15 understanding as to what means-plus-function claim
10:25:42 16 terms are and how you determine whether or not such
10:25:47 17 a construction is appropriate, right?
10:25:49 18 A Yes.
10:25:50 19 Q And do you understand that claim terms are
10:25:57 20 -- certain claim terms can be construed as
10:25:59 21 means-plus-function elements or they may not be? Do
10:26:05 22 you understand that?
10:26:06 23 A I understand -- what I understand is that's
10:26:11 24 a legal proceeding, that determination.
10:26:14 25 Q Yeah. And you understand that when a term

10:26:19 1 such as control component is construed as a
10:26:21 2 means-plus-function claim term, it may have a
10:26:24 3 different meaning than if it was not construed as a
10:26:29 4 means-plus-function claim term, right?
10:26:33 5 A Well, clearly the meaning is interpretable
10:26:38 6 based upon which construction is used.
10:26:40 7 Q Okay. I'm not sure what that means. But a
10:26:43 8 court could say or a -- the Board at the PTAB could
10:26:47 9 say that this term means X, Y and Z under a
10:26:52 10 means-plus-function construction or they could
10:26:55 11 disagree and say that we do not think that this is a
10:26:57 12 means-plus-function term and this is what this
10:26:59 13 particular claim term means, correct?
10:27:02 14 A As a -- as a proceeding of construction, the
10:27:10 15 claim term would be further specified.
10:27:15 16 Q Can you explain to me what that means?
10:27:17 17 A Well, in any -- in any claim construction
10:27:22 18 proceeding, the elements are further specified what
10:27:26 19 they mean.
10:27:28 20 Q Where?
10:27:29 21 A I'm just saying in general. I'm sorry. I'm
10:27:33 22 trying to -- I'm trying to tell you my
10:27:37 23 understanding.
10:27:37 24 Q And I appreciate that. But what I'm trying
10:27:39 25 to understand is did you analyze the applicability

10:27:45 1 of the prior art for the control component claim
10:27:48 2 term as if the only possible construction were
10:27:53 3 means-plus-function?
10:27:57 4 A Again, I responded to whatever Dr. Wolfe
10:28:00 5 presented. That was what I was asked to do was to
10:28:04 6 rebut that.
10:28:05 7 Q And is it your understanding -- I'm sorry.
10:28:10 8 Go ahead.
10:28:11 9 A And my understanding is what he presented
10:28:14 10 was a means-plus-function construction.
10:28:21 11 Q Okay.
10:28:22 12 A That was his analysis.
10:28:23 13 Q Well, let me ask you this -- I don't think
10:28:28 14 that's correct. I think --
10:28:29 15 A Can I interject?
10:28:32 16 Q Sure.
10:28:33 17 A Because if you -- and I'm not sure which one
10:28:39 18 I'm looking at here, but if you -- sorry. I'm
10:28:50 19 looking in his declaration where he says that.
10:29:12 20 Apologize. I'm not sure why I'm not finding it.
10:29:41 21 Okay, I'm sorry.
10:29:42 22 So in his paragraph 128, when he says,
10:29:56 23 "Additionally, I have noted that several claim
10:29:59 24 limitations appear to be expressed in
10:30:02 25 means-plus-function form. I have identified

10:30:04 1 means-plus-function construction of several terms
10:30:06 2 and have considered the function and corresponding
10:30:10 3 disclosed structure in forming my opinions."
10:30:17 4 Q I understand. And I agree with you that he
10:30:21 5 did present opinions as if the claim terms were
10:30:24 6 construed under the means-plus-function.
10:30:27 7 A Right. And so that was my analysis.
10:30:29 8 Q Yeah. But he also provided his analysis
10:30:33 9 should the court decide that the claim terms are not
10:30:37 10 means-plus-function. In other words, let me start
10:30:39 11 again.
10:30:40 12 Is it -- it's your understanding, correct,
10:30:43 13 let me start again.
10:30:44 14 Do you understand that the Board itself will
10:30:47 15 be construing these claim terms?
10:30:49 16 A Yes.
10:30:50 17 Q Right. And the parties can provide their
10:30:53 18 views on whether and how these claim terms should be
10:30:56 19 construed, but ultimately the Board's going to
10:30:58 20 decide what it thinks, correct?
10:31:00 21 A Of course.
10:31:01 22 Q Right. And the Board can disagree with
10:31:10 23 Samsung, Resonant, you, and Dr. Wolfe as to whether
10:31:14 24 or not these claim terms, the control component
10:31:19 25 term, for example, should be construed as a

10:31:21 1 means-plus-function element, correct?
10:31:23 2 A The Board will make the decision.
10:31:25 3 Q Yeah. So the Board may disagree with
10:31:30 4 Samsung, Resonant, you, and Dr. Wolfe as to whether
10:31:36 5 or not the term "control component" should be
10:31:37 6 construed as means-plus-function element, correct?
10:31:41 7 A Sure.
10:31:42 8 Q Yeah. And in your declaration, you didn't
10:31:44 9 provide any testimony or any opinions as to what the
10:31:49 10 impact of the prior art would be on the control
10:31:52 11 component term should the court decide that the
10:31:56 12 claim term "control component" should not be
10:32:00 13 construed as means-plus-function, isn't that right?
10:32:04 14 A Well, not in entirety, but my job was to
10:32:12 15 rebut Wolfe's arguments. And the only argument he
10:32:16 16 presented for the control component was a
10:32:19 17 means-plus-function construction of it.
10:32:24 18 Q Okay. Well, I mean reasonable minds can
10:32:27 19 disagree. I don't think that's correct. But
10:32:30 20 whether it is or it isn't, I just need a simple --
10:32:34 21 my question to you is more straightforward.
10:32:36 22 Did you provide in your declaration any
10:32:39 23 analysis of how the prior art affected the claims of
10:32:48 24 the '081 and '830 patents should the Board decide
10:32:52 25 that terms such as "control component" should not be

10:32:56 1 construed as means-plus-function?
10:32:58 2 A Well, okay. So let me -- I mean, I don't
10:33:04 3 want to be long-winded, but I'll just state again
10:33:07 4 that what I was asked to do was to review
10:33:12 5 Dr. Wolfe's arguments that he presented and rebut
10:33:14 6 them if I felt that they were incorrect. And I've
10:33:18 7 done so.
10:33:19 8 Now, inasmuch as some unknown construction
10:33:29 9 -- because you're saying -- I don't even know what
10:33:33 10 would be meant by some other construction, you know,
10:33:38 11 what -- I guess just as the words are written in the
10:33:41 12 patent, is that the idea? With no construction?
10:33:48 13 Q I don't know -- you don't get to ask the
10:33:54 14 questions here. Well, terms are construed --
10:33:58 15 A I'm asking for a clarification of your
10:34:00 16 question because you're saying have I performed any
10:34:03 17 analysis in a non-means-plus-function construction
10:34:10 18 of the claim elements. And I'm asking do you mean
10:34:17 19 simply as the words are written in the patent with
10:34:20 20 no other understanding or construction?
10:34:23 21 Q Well, you understand that claim terms are
10:34:26 22 construed as they would be understood by a person
10:34:29 23 having ordinary skill in the art, correct?
10:34:32 24 A Well, I mean, I guess what I'm asking is do
10:34:36 25 you mean according to the plain and ordinary

10:34:37 1 meaning?
10:34:38 2 Q Yes. Let's start there.
10:34:40 3 A Okay. I mean, in terms of analyzing the
10:34:49 4 plain and ordinary meaning, have I provided any
10:34:52 5 analysis of rebuttal to Wolfe. I would say the
10:34:59 6 answer is yes because as I state in my declaration,
10:35:08 7 Wolfe used Fukumoto as the basis for the presence of
10:35:13 8 the power supply element and he never identified a
10:35:19 9 power supply in Fukumoto.
10:35:29 10 Q Okay. Let's talk about the -- let's back up
10:35:33 11 a second. I don't think either party is saying that
10:35:35 12 the term "power supply" should be construed as a
10:35:38 13 means-plus-function element. Let's focus on those
10:35:40 14 that the parties have proposed means-plus-function
10:35:45 15 constructions on. Why don't we just focus on
10:35:48 16 control component.
10:35:52 17 Did you provide any analysis under a plain
10:35:56 18 and ordinary meaning for the term "control
10:35:58 19 component" in your declaration?
10:36:01 20 A And again, I would say only inasmuch as the
10:36:06 21 control component is -- the plain and ordinary
10:36:09 22 meaning of the control component in the claim is
10:36:14 23 that it controls the power supply. And so at the
10:36:24 24 very least, a power supply is included within -- or
10:36:29 25 at least has to exist in order for the control

10:36:33 1 component to exist. And Wolfe did not identify what
10:36:40 2 the power supply was in Fukumoto. He just said it
10:36:46 3 must be there.
10:36:47 4 Q Is it your opinion that in order to construe
10:36:50 5 or provide a plain and ordinary meaning for the term
10:36:53 6 "control component," you have to also construe the
10:36:56 7 term "power supply"?
10:36:59 8 A Well, you don't have to construe it. But I
10:37:02 9 mean, the control component is connected, so to
10:37:10 10 speak, with the power supply and so you can't have a
10:37:12 11 plain and ordinary meaning of the control component
10:37:17 12 without having a power supply.
10:37:21 13 Q In your work in this case, did you read the
10:37:30 14 Institution Decisions in the '992 and '993
10:37:32 15 proceedings? And if you don't know what Institution
10:37:35 16 Decision is, let me know.
10:37:38 17 A I may have, but you'll have to provide me or
10:37:41 18 point me to the document to refresh my memory.
10:37:45 19 Q Okay. So I put them into the chat.
10:37:47 20 A Okay.
21 (Institution Decision document in
22 IPR2023-00992 was presented.)
23 (Institution Decision document in
24 IPR2023-00993 was presented.)
25 ///

10:37:50 1 BY MR. MILLER:
10:37:50 2 Q Let me see if I can figure out what the file
10:37:53 3 names are for you. They both start with the -- let
10:38:00 4 me start again.
10:38:01 5 The file names for the Institution Decisions
10:38:04 6 start with the date 2024-01-10.
10:38:17 7 A Can you give me the Ex number?
10:38:21 8 Q They don't have Ex numbers. They're not
10:38:24 9 exhibits.
10:38:25 10 A Okay. I gotcha. Okay. So which one of
10:38:28 11 these, the dates.
10:38:29 12 Q The 2024-01-10. There's two of them.
10:38:34 13 A Yes, which one do you want me to look at?
10:38:36 14 Q I'd like you to at least open both of them
10:38:39 15 and tell me if in the process of preparing your
10:38:44 16 declaration or in your work in this matter, you
10:38:46 17 reviewed these documents?
10:38:48 18 A I may have briefly reviewed them.
10:38:59 19 Q Why don't we look at the Institution
10:39:05 20 Decision just briefly for the '992 matter? So this
10:39:07 21 is -- the file name would be 2024-01-10-IPR
10:39:15 22 2023-00992[16], et cetera. Do you see that?
10:39:18 23 A I believe I'm looking at that.
10:39:20 24 Q Okay. Great. Can you go to page 27 of that
10:39:34 25 document?

10:39:45 1 A Okay. Yes.
10:39:55 2 Q If you look at the top of page 27 of the
10:40:00 3 '992 Institution Decision, you'll see that the Board
10:40:09 4 in not so many words is basically saying that
10:40:12 5 they'll determine whether or not certain terms of
10:40:16 6 this -- of the claims in the '081 patent should be
10:40:22 7 construed under 112's means-plus-function language
10:40:37 8 during the trial. Do you see that?
10:40:39 9 A Yes, I think so.
10:40:41 10 Q Right. So at least based on the current
10:40:44 11 record, the Board is saying terms like control
10:40:47 12 component maybe should be construed as
10:40:52 13 means-plus-function or maybe should not be construed
10:40:54 14 as means-plus-function. Do you see that?
10:40:56 15 A Okay.
10:41:00 16 Q Do you understand that?
10:41:02 17 A Yeah, it hasn't been decided yet.
10:41:04 18 Q Yeah. So my question for you is that should
10:41:07 19 the Board decide that the terms such as "control
10:41:10 20 component" should not be construed as
10:41:12 21 means-plus-function, you haven't put any evidence in
10:41:17 22 under that construction, have you?
10:41:19 23 A Well, in terms of evidence, I've made
10:41:28 24 statements in my declaration in response to what
10:41:31 25 Wolfe -- what my declaration -- or my report, I'm

10:41:34 1 sorry. I'm sorry, I don't know which it is -- is a
10:41:37 2 rebuttal of Wolfe. And inasmuch as the control
10:41:41 3 component -- I mean, as the claim is written, it has
10:41:45 4 a power supply, right. The control component
10:41:47 5 controls the power supply. So the power supply has
10:41:51 6 to exist and it was not identified by Wolfe in
10:41:56 7 Fukumoto.
10:41:56 8 Q I --
10:41:58 9 A That would be -- you're speaking on top of
10:42:02 10 me now.
10:42:02 11 Q I apologize.
10:42:03 12 A And so even if there's no construction of
10:42:07 13 the claim, that analysis by myself still holds that
10:42:14 14 the power supply has not been identified.
10:42:16 15 Q Yeah. And that may be an issue that
10:42:20 16 Dr. Wolfe has and Samsung need to face, but my
10:42:23 17 question to you is different.
10:42:25 18 You analyzed the term "control component"
10:42:28 19 and you put in your opinions as if it were construed
10:42:31 20 as a means-plus-function claim element, correct?
10:42:35 21 A Inasmuch as I was responding to what Wolfe
10:42:39 22 said.
10:42:40 23 Q Yeah. But should the Board decide that the
10:42:43 24 term should not be construed as means-plus-function,
10:42:46 25 you have not provided any opinions in that regard,

10:42:48 1 have you?
10:42:50 2 A Well, only inasmuch as the power supply was
10:42:55 3 not identified by Wolfe and that would be true
10:43:00 4 whether or not it was further construed.
10:43:05 5 Q Why don't you pull out Exhibit 2008, which
10:43:09 6 is your declaration.
10:43:10 7 A Okay. Yes.
10:43:20 8 Q Hold on one moment, please. And if you
10:44:12 9 could go to paragraph 83 of your declaration.
10:44:25 10 A Yes.
10:44:25 11 Q There you say, "Samsung's discussion of
10:44:28 12 limitation 1(f) fails to show that the control
10:44:31 13 component Samsung identifies in Fukumoto would have
10:44:35 14 provided an output to the power supply."
10:44:37 15 Do you see that?
10:44:38 16 A Yes.
10:44:38 17 Q And now, if you could pull up the '081
10:44:50 18 patent which I provided you.
10:44:59 19 A Yes.
10:44:59 20 (Document marked previously as
10:44:59 21 Exhibit 1001 in IPR2023-00992 was
10:44:59 22 presented.)
10:45:04 23 BY MR. MILLER:
10:45:04 24 Q And I'd like you to go to claim 1 which is
10:45:08 25 in column 15 towards the end of the document.

10:45:12 1 A Yes.
10:45:13 2 Q The claim term that I'm interested in is the
10:45:19 3 control component limitation.
10:45:20 4 A Yes.
10:45:21 5 Q It states, "A control component that
10:45:23 6 controls supply of power from the power supply to
10:45:26 7 the driving component," et cetera.
10:45:27 8 Do you see that?
10:45:28 9 A Yes.
10:45:28 10 Q And I understand that both parties have
10:45:31 11 proposed that means-plus-function -- let me back up.
10:45:39 12 What is your understanding as to how
10:45:41 13 means-plus-function terms are supposed to be
10:45:43 14 construed?
10:45:45 15 A Well, it means that if a function is stated,
10:45:53 16 but the means are not clear, it has to be further
10:45:58 17 specified what those means are. Is that the right
10:46:02 18 way of putting it?
10:46:04 19 Q And how are those functions further
10:46:06 20 specified?
10:46:07 21 A With structures.
10:46:09 22 Q Okay. And where do those structures come
10:46:11 23 from?
10:46:12 24 A From the construction.
10:46:15 25 Q From the construction of what?

10:46:16 1 A Well, the means-plus-function claim
10:46:20 2 construction.
10:46:21 3 Q So is it your understanding that -- well,
10:46:32 4 let me start again.
10:46:33 5 So if you look at the claim language itself,
10:46:40 6 a control component that controls supply of power.
10:46:44 7 Do you see that?
10:46:44 8 A Yes.
10:46:45 9 Q My understanding is when I look at
10:46:48 10 paragraph 83 of your declaration, you criticize
10:46:54 11 Dr. Wolfe's read because, in your opinion, he
10:46:56 12 doesn't provide any opinions as to how Fukumoto's
10:47:05 13 power supply -- excuse me -- how Fukumoto provides
10:47:10 14 an output to the power supply.
10:47:12 15 Do you see that?
10:47:12 16 A Yes.
10:47:13 17 Q And if you look at the claim language
10:47:15 18 itself, all that's required is that a control
10:47:20 19 component control a supply of power from the power
10:47:25 20 supply?
10:47:25 21 A Yes.
10:47:26 22 Q To a driving component, right?
10:47:29 23 A Correct.
10:47:30 24 Q And under that language, there's no
10:47:34 25 requirement that there be a direct connection

10:47:36 1 between the power supply and the control component,
10:47:40 2 is there?
10:47:43 3 A Well, I mean, in that question you're asking
10:47:49 4 me to perform a construction.
10:47:52 5 Q Well, where does the claim language itself
10:47:55 6 say that the control component is connected to the
10:47:59 7 power supply?
10:48:01 8 A Well, I mean, if it controls the power
10:48:04 9 supply -- I mean, you're asking me to perform
10:48:08 10 construction and so I'll qualify my answer that I'm
10:48:14 11 not attempting here to perform construction. But I
10:48:20 12 mean, if the control component controls the power
10:48:24 13 supply, it would seem that it would have to have
10:48:27 14 some sort of connection to it.
10:48:32 15 Q But that control could be indirect, correct?
10:48:39 16 A Through another element?
10:48:41 17 Q Yeah. In other words, the processor could
10:48:44 18 say be connected to one component and provide
10:48:49 19 outputs to that one component that could then be
10:48:51 20 connected through one or more other components to
10:48:55 21 the power supply that gets the power supply to do
10:48:59 22 whatever it is the processor's hoping to accomplish,
10:49:01 23 correct?
10:49:01 24 A Well, there's no processor in the claim.
10:49:05 25 Q Well, the control component. Excuse me.

10:49:09 1 A Yeah, if you're saying there could be some
10:49:13 2 other element between the control component and the
10:49:18 3 power supply, well, that seems a much more -- a much
10:49:25 4 larger additional complication than just considering
10:49:29 5 that there's some sort of connection between the
10:49:32 6 control component and the power supply.
10:49:34 7 Q So is it your understanding then that
10:49:38 8 should, for example, the control component term be
10:49:41 9 construed as being something other than a
10:49:44 10 means-plus-function element, that the claim is
10:49:46 11 broader than it would have been as a
10:49:50 12 means-plus-function term?
10:49:52 13 A No. I'm not trying to construe the claim
10:49:56 14 terms. I'm answering your question. I believe your
10:50:03 15 question was within the claim language itself, would
10:50:07 16 a POSITA understand that there's some sort of
10:50:10 17 connection between the control component and the
10:50:14 18 power supply. And I mean, you know, inasmuch as --
10:50:20 19 I'm not trying to construe the claim terms, I would
10:50:23 20 just say kind of yes because if it controls the
10:50:26 21 power supply, there has to be some connection. I
10:50:32 22 mean, you're saying I could control it with an
10:50:36 23 intermediary. I don't know what that intermediary
10:50:39 24 would be. There's nothing in the claim language
10:50:42 25 that would indicate there would be some

10:50:44 1 intermediary.
10:50:45 2 Q Well, there's nothing in the claim language
10:50:47 3 that says there isn't an intermediary either, is
10:50:51 4 there?
10:50:51 5 A Well --
10:50:52 6 Q All the claim language requires is that
10:50:54 7 there be some form of control of supply of power,
10:50:58 8 correct? There's no words in that claim that says
10:51:02 9 that the control component is connected to the power
10:51:05 10 supply, isn't that --
10:51:06 11 A No, but that's -- I'm sorry. That would be
10:51:09 12 -- however, the simplest interpretation would be
10:51:12 13 that there's a connection between the control
10:51:15 14 component and the power supply.
10:51:16 15 Q That's not the only construction, correct?
10:51:19 16 A I'm not making any constructions here. I'm
10:51:22 17 just saying as a POSITA, that would be my
10:51:26 18 interpretation.
10:51:28 19 Q So let me see if I can summarize what I
10:51:37 20 understand you to be saying which is that you
10:51:39 21 understand that Dr. Wolfe only supplied analysis and
10:51:43 22 opinions regarding the control component term as
10:51:49 23 construed under a means-plus-function analysis and
10:51:57 24 you didn't provide any other testimony or opinions
10:52:00 25 in that regard, correct?

10:52:03 1 MR. RUBIN: Objection, form.
10:52:05 2 BY MR. MILLER:
10:52:05 3 Q Let me rephrase. Let me see if I can
10:52:08 4 summarize what I understand you to be saying today.
10:52:14 5 It's your understanding that Dr. Wolfe only
10:52:17 6 provided his opinion as to how the prior art
10:52:24 7 described what's claimed in the -- in the '081 and
10:52:34 8 '830 patents where the terms "control component,"
10:52:40 9 for example, have a means-plus-function
10:52:43 10 construction, isn't that right?
10:52:45 11 A I believe that's true.
10:52:48 12 Q Okay. I want to ask you some questions
10:53:05 13 about the power supply term that's recited in the
10:53:09 14 claims of both of the '081 and '830 patents.
10:53:15 15 A Okay.
10:53:15 16 Q If you could pull up Dr. Wolfe's declaration
10:53:48 17 from the '992 proceeding, Exhibit 1003.
10:53:56 18 A Yes.
10:53:57 19 Q Do you have it?
10:53:59 20 A Yes.
10:53:59 21 Q Great. If you'd go to paragraph 169, and we
10:54:14 22 might as well pull out his declaration from the
10:54:17 23 other petition as well.
10:54:26 24 A I'm sorry. Hold on. '992. Okay. Hold on.
10:54:35 25 Sorry, I'm in the '992 declaration.

10:54:35 1 (Document marked previously as
10:54:35 2 Exhibit 1003 in IPR2023-00993 was
10:54:35 3 presented.)
10:54:39 4 BY MR. MILLER:
10:54:39 5 Q So for this term there's parallel,
10:54:44 6 essentially identical opinions from Dr. Wolfe in the
10:54:48 7 other declaration as well.
10:54:49 8 A What paragraph am I looking at in the '992
10:54:52 9 declaration?
10:54:53 10 Q 169.
10:54:55 11 A Yes.
10:54:56 12 Q And then if you could -- well, let's do that
10:55:14 13 at the end. Okay.
10:55:15 14 So in paragraph 169 of Dr. Wolfe's
10:55:23 15 declaration in the '992 proceeding, do you see where
10:55:31 16 Dr. Wolfe is referring to Fukumoto's disclosure of
10:55:39 17 small drive power?
10:55:42 18 A Yes.
10:55:42 19 Q And that that reduces power consumption?
10:55:49 20 A I see the words there.
10:55:51 21 Q Yeah. And just so the record is clear, if
10:55:54 22 you look at paragraph 165 of Dr. Wolfe's declaration
10:55:59 23 in the '993 proceeding, the analysis is essentially
10:56:05 24 identical. Do you see that?
10:56:06 25 A Which paragraph again?

10:56:08 1 Q 165.
10:56:18 2 A Yes. It appears to be the same paragraph.
10:56:31 3 Q Great. Thank you. Do you see any reference
10:56:34 4 to a battery in those --
10:56:38 5 A Here?
10:56:38 6 Q Yes.
10:56:40 7 A In this paragraph?
10:56:42 8 Q Correct.
10:56:43 9 A Not in this paragraph, no.
10:56:45 10 Q Do you see in these two paragraphs, 169 in
10:57:01 11 the '992 and 165 in the '993, where Dr. Wolfe opines
10:57:06 12 that "A POSITA would have understood and found it at
10:57:10 13 least obvious that the 'small power' is supplied to
10:57:15 14 the coil as an alternating current using a power
10:57:21 15 supply"?
10:57:21 16 A Well, I see the sentence, yes.
10:57:24 17 Q So you would agree --
10:57:29 18 A I disagree with it.
10:57:30 19 Q Okay. You can disagree with it, but my
10:57:32 20 questions are not asking about that just yet.
10:57:36 21 Dr. Wolfe, when he says that, is providing
10:57:40 22 his opinion that the power supply of Fukumoto would
10:57:44 23 supply alternating current, correct?
10:57:52 24 A Well, I mean, there's no direct connection
10:58:04 25 there where I would foresee that interpretation that

10:58:10 1 what he's considering to be the power supply is an
10:58:15 2 AC power supply. He says AC -- an alternating
10:58:25 3 current is supplied using a power supply. So I'm
10:58:33 4 not sure I interpret that statement as meaning he
10:58:36 5 thinks a power supply is an AC power supply.
10:58:42 6 Q My question was -- okay. So you don't think
10:58:54 7 that's what Dr. Wolfe is saying? Let me start
10:58:58 8 again.
10:58:58 9 You do not believe that Dr. Wolfe is opining
10:59:02 10 that the power supply in Fukumoto supplies an
10:59:05 11 alternating current? Is that a correct
10:59:08 12 understanding of your view?
10:59:10 13 A I'm saying I couldn't make that
10:59:15 14 interpretation one way or the other based on what's
10:59:17 15 written here.
10:59:18 16 Q Let me ask you this, I believe you say this
10:59:24 17 in your declaration, a battery does not supply
10:59:27 18 alternating current, correct?
10:59:29 19 A No.
10:59:32 20 Q And here, Dr. Wolfe is not -- there's no
10:59:36 21 reference to a battery in paragraph 169 and
10:59:42 22 paragraph 165 of his two declarations, is there?
10:59:45 23 A Well, he left it to me to figure out where
10:59:48 24 in Fukumoto the power supply was and the only thing
10:59:53 25 close to a power supply was a battery in Fukumoto.

10:59:58 1 Q So that's your interpretation. But
11:00:02 2 Dr. Wolfe never said that the battery was the power
11:00:06 3 supply, did he?
11:00:07 4 A He never said what the power supply was.
11:00:09 5 Q Including a battery, in your opinion,
11:00:12 6 correct?
11:00:13 7 A He did not identify a power supply.
11:00:16 8 Q Why don't we pull out Fukumoto? And for the
11:00:37 9 record, Fukumoto is Exhibit 1005 in both
11:00:41 10 proceedings. Let me know when you've had an
11:00:54 11 opportunity to download it.
11:00:55 12 A I have it.
11:00:55 13 (Document marked previously as
11:00:55 14 Exhibit 1005 was presented.)
11:00:56 15 BY MR. MILLER:
11:00:56 16 Q Great. So why don't we go to column 16 of
11:01:00 17 Fukumoto? Let me know when you get there.
11:01:14 18 A I'm at column 16.
11:01:15 19 Q Great. And then I guess going to about
11:01:22 20 line 38 of column 16, there's a discussion regarding
11:01:30 21 Figure 4 of Fukumoto. Do you see that?
11:01:33 22 A Yes.
11:01:35 23 Q Figure 4 is a waveform. Do you see that?
11:01:44 24 A So you want me to go to Figure 4 now?
11:01:49 25 Q If you could, yeah.

11:01:50 1 A Okay.
11:01:52 2 Q I mean, my questions aren't really so much
11:01:56 3 about the waveform, but maybe we'll get into that.
11:01:59 4 If you go to -- the text of the patent where I
11:02:02 5 directed you states that "Next, Figure 4 is a view
11:02:06 6 illustrating a waveform of a drive signal applied to
11:02:09 7 an oscillator actuator 115."
11:02:13 8 A Yes.
11:02:13 9 Q And Figure 4, it shows a waveform, right?
11:02:17 10 A Yes, a sine wave; what appears to be a sine
11:02:21 11 wave.
11:02:21 12 Q And just to be clear, Figure 4 illustrates a
11:02:31 13 waveform of a drive signal, right?
11:02:36 14 A Well, that's what is stated here, yes.
11:02:40 15 Q Okay. And then in Figure 4, the drive
11:02:45 16 signal, according to Fukumoto, is made to match with
11:02:53 17 the natural frequency of the case actuator. Do you
11:02:56 18 see that?
11:02:57 19 A Yes.
11:02:58 20 Q And because of this, matching Fukumoto's
11:03:09 21 drive signal to the natural frequency make it
11:03:11 22 "possible to reduce the power consumption of the
11:03:17 23 PDA."
11:03:18 24 Do you see that?
11:03:18 25 A Yes.

11:03:18 1 Q And this is possible because the drive
11:03:20 2 signal at the natural frequency imparts "a larger
11:03:25 3 vibration to the user using small drive power."
11:03:30 4 Do you see that?
11:03:31 5 A Yes.
11:03:31 6 Q Okay. On line -- starting at around line 60
11:03:37 7 of column 16, there's a heading "A-2: Operation of
11:03:43 8 First Embodiment."
11:03:45 9 Do you see that?
11:03:46 10 A Yes.
11:03:46 11 Q And this refers to Fukumoto's Figure 5. Do
11:03:57 12 you see that?
11:03:57 13 A I see -- do you want me to go to Figure 5
11:04:03 14 or --
11:04:04 15 Q You should feel free to go to wherever you
11:04:09 16 need to go to answer my questions. My question is
11:04:12 17 pretty high level at this point which is where
11:04:14 18 Fukumoto discusses the operation of the first
11:04:17 19 embodiment, the patent's referring to Figure 5,
11:04:21 20 correct?
11:04:22 21 A Okay.
11:04:23 22 Q Do you see that?
11:04:23 23 A Yes.
11:04:24 24 Q And then this discussion continues to lines
11:04:34 25 -- to column 17 of Fukumoto. Do you see that?

11:04:38 1 A Yes.
11:04:39 2 Q And if you go to column 17, it discusses
11:04:48 3 initially step S101.
11:04:52 4 A Okay.
11:04:57 5 Q Do you see that? Starting at line 1,
11:05:02 6 Fukumoto states, "As shown in the figure, the CPU
11:05:07 7 113 determines whether a touch signal has been input
11:05:10 8 from the touch panel 102 and whether a key operation
11:05:14 9 signal has been input from the key input 111 (step
11:05:19 10 S101)."
11:05:21 11 Do you see that?
11:05:22 12 A Okay. I see the sentence, yes.
11:05:24 13 Q So in step S101, the CPU in Fukumoto is
11:05:30 14 detecting user input, correct?
11:05:32 15 A That's what's stated there, yes.
11:05:37 16 Q You don't have any reason to disagree with
11:05:41 17 what Fukumoto is saying there, do you?
11:05:42 18 A No, I mean I can read the sentence.
11:05:44 19 Q Okay. Fukumoto goes on to say that --
11:05:51 20 starting at around line 7 in column 17, "When the
11:06:02 21 CPU 113 determines that at least one of the touch
11:06:06 22 signal or key operation signal has been input, it
11:06:10 23 reads from the memory 112 the waveform data of the
11:06:14 24 drive signal to be applied to the oscillatory
11:06:18 25 actuator 115 (S102)."

11:06:21 1 Do you see that?
11:06:21 2 A Yes.
11:06:21 3 Q So in other words, if user input is detected
11:06:31 4 then in step S102, the CPU in Fukumoto reads
11:06:36 5 waveform data for the corresponding drive signal
11:06:38 6 from memory, right?
11:06:42 7 A Yes, it reads the waveform data from memory.
11:06:46 8 Q Then the CPU outputs the waveform data read
11:06:52 9 from memory 112 to the drive signal generation
11:06:56 10 circuit 114. Do you see that?
11:07:03 11 A Where are you reading?
11:07:06 12 Q Yeah, let me start again. So if you go to
11:07:08 13 column 17, line 20.
11:07:11 14 A Okay. Yes, I see that there.
11:07:16 15 Q Great. That states that "Next, the CPU 113
11:07:20 16 outputs the waveform data read from the memory 112
11:07:24 17 to the drive signal generation circuit 114."
11:07:27 18 Do you see that?
11:07:28 19 A Yes.
11:07:29 20 Q So what's your understanding as to what that
11:07:35 21 waveform data includes?
11:07:39 22 A Whatever data is necessary to generate the
11:07:42 23 waveform.
11:07:44 24 Q Is it your understanding that the waveform
11:07:46 25 data would include the frequency of the waveform?

11:07:52 1 A It could.
11:07:56 2 Q If you go to column 16, line 44 of Fukumoto.
11:08:11 3 A Column 16?
11:08:12 4 Q Yes.
11:08:13 5 A Okay.
11:08:21 6 Q There Fukumoto states "Applying a drive
11:08:27 7 signal of such a frequency f0 to the coil 121 causes
11:08:32 8 the main case 101 or the oscillatory actuator 115 of
11:08:38 9 the PDA to resonate," et cetera.
11:08:41 10 Do you see that?
11:08:41 11 A Yes.
11:08:41 12 Q So that states that the waveform data has a
11:08:44 13 frequency, right?
11:08:45 14 A Okay.
11:08:50 15 Q If you applied a DC circuit to an actuator,
11:08:57 16 I don't think anything would happen, would it?
11:08:58 17 A Well, it depends on the actuator, but in
11:09:01 18 terms of the coils we're generally discussing here,
11:09:07 19 well, I'd have to review what the exact structure
11:09:11 20 was.
11:09:21 21 Q If you go to -- continuing in that same
11:09:24 22 section or same paragraph of column 16 of Fukumoto
11:09:29 23 talking about the waveform data, it says, "Such
11:09:32 24 frequency data or amplitude data, et cetera, is
11:09:36 25 stored in the memory 112 as the waveform data of the

11:09:39 1 drive signal."
11:09:39 2 Do you see that?
11:09:40 3 A Yes.
11:09:44 4 Q So at least according to Fukumoto, the
11:09:47 5 waveform data that it's describing has frequency
11:09:52 6 data and amplitude data, correct?
11:09:56 7 A According to that sentence, yes.
11:09:57 8 Q So let's go back to column 17 in Fukumoto
11:10:17 9 at around line 21.
11:10:24 10 A Yes.
11:10:24 11 Q There Fukumoto states that "At the same
11:10:28 12 time, the CPU 113 instructs the drive signal
11:10:32 13 generation circuit 114 to generate a drive signal
11:10:36 14 step S103."
11:10:38 15 Do you see that?
11:10:39 16 A Yes.
11:10:39 17 Q And then continuing to column 17, lines 24
11:10:49 18 through 26, there Fukumoto is describing that in
11:10:56 19 response to receiving this information from the CPU,
11:11:02 20 the drive signal generation circuit 114 generates a
11:11:07 21 drive signal using the waveform data, correct?
11:11:10 22 A Yes.
11:11:11 23 Q So then returning to Figure 4 -- and now you
11:11:18 24 should feel free to go look at it -- this depicts an
11:11:23 25 exemplary waveform of a drive signal that might be

11:11:27 1 generated by the drive signal generation circuit 114
11:11:30 2 in Fukumoto, correct?
11:11:32 3 A I think so, yes.
11:11:34 4 Q We've been going for more than an hour. Do
11:11:46 5 you want to take a break?
11:11:47 6 A It's up to you.
11:11:49 7 Q I could use one.
11:11:52 8 (Short recess.)
11:22:41 9 BY MR. MILLER:
11:22:57 10 Q Could you pull out the '081 and '830 patents
11:23:00 11 again, please?
11:23:04 12 A Yes.
11:23:04 13 (Document marked previously as
11:23:04 14 Exhibit 1001, in IPR2023-00993, was
11:23:04 15 presented.)
11:23:11 16 BY MR. MILLER:
11:23:11 17 Q So in the '081 patent earlier today we were
11:23:15 18 talking about the control component limitation?
11:23:18 19 A Yes.
11:23:19 20 Q And we talked about how the claim language
11:23:24 21 itself states that a control component that controls
11:23:28 22 supply of power from the power supply to the driving
11:23:31 23 component, et cetera. Do you remember that?
11:23:32 24 A Yes.
11:23:34 25 Q So the control component as recited in, for

11:23:41 1 example, claim 1 of the '081 patent, it controls the
11:23:47 2 supply of power, correct?
11:23:51 3 A Yes.
11:23:54 4 Q Yeah. And so there's no words there that
11:23:58 5 say that the control component has to control the
11:24:03 6 power supply itself, correct?
11:24:07 7 A No, there isn't. It's just the simplest --
11:24:11 8 I mean, it was my interpretation.
11:24:14 9 Q So the control component, for example, it
11:24:22 10 could sit between the power supply and the driving
11:24:25 11 component, correct?
11:24:29 12 A Well, I mean, the controller -- the control
11:24:39 13 component -- I mean, you're saying that it would
11:24:47 14 only -- it wouldn't control anything then.
11:24:54 15 Q That's not what I'm saying. I'm not really
11:24:58 16 saying anything. All I'm trying to ask you is in
11:25:00 17 your opinion, you just told me that the claim only
11:25:03 18 requires that the control component controls the
11:25:07 19 supply of power, but it does not have to control the
11:25:11 20 power supply.
11:25:11 21 So my question to you now is that the
11:25:14 22 control component could be something that, for
11:25:17 23 example, sits in between the control component and
11:25:22 24 the power supply, correct?
11:25:25 25 A Well, I don't think I'm supposed to perform

11:25:30 1 claim construction. And I'll just say that the main
11:25:34 2 embodiment shows the control component controlling
11:25:38 3 the power supply.
11:25:39 4 Q That's what's disclosed in the patent, but
11:25:44 5 the claim is not so limited, correct, just on its
11:25:50 6 plain face?
11:25:50 7 A I apologize. But it's sort -- I've been in
11:25:59 8 -- my understanding is I'm not supposed to perform
11:26:02 9 claim construction.
11:26:06 10 Q All right. I apologize for all the paper
11:26:33 11 shuffling that I have to do here, but my desk is
11:26:38 12 only so big and we have a lot of documents here. So
11:26:40 13 just bear with me.
11:26:54 14 I'd like you to pull out Dr. Wolfe's
11:26:57 15 declaration. And I believe we can just focus or use
11:26:59 16 his declaration from the '992 proceeding. The
11:27:03 17 material in the other proceeding is essentially the
11:27:06 18 same. So this would be Exhibit 1003 from the '992
11:27:12 19 proceeding.
11:27:12 20 A Yes.
11:27:13 21 Q Let me know when you get there.
11:27:15 22 A I have it.
11:27:16 23 Q Great. Thank you. If you could, please, to
11:27:27 24 paragraph 180.
11:27:34 25 A Yes.

11:27:35 1 Q So in paragraph 180 of his '992 declaration,
11:27:45 2 Dr. Wolfe is providing his opinion that "The
11:27:51 3 components required" -- let me start again.
11:27:56 4 In paragraph 180 of Dr. Wolfe's '992
11:27:59 5 declaration, Dr. Wolfe is providing his opinion that
11:28:04 6 the components required to convert power supplied
11:28:09 7 from, for example, the battery in an electronic
11:28:14 8 device to the AC drive signal were well-known at the
11:28:19 9 relevant time. Do you see that?
11:28:24 10 A That's what he says.
11:28:26 11 Q That's not really a controversial statement,
11:28:34 12 is it?
11:28:34 13 A Well, I mean, it's not part of my analysis
11:28:40 14 whether that statement is true or not.
11:28:42 15 Q Well, let me ask you this. In your view,
11:28:50 16 circuitry that converted, you know, DC power into AC
11:28:57 17 power, they were well-known before the patents
11:29:01 18 involved in these IPR proceedings were filed,
11:29:03 19 correct?
11:29:04 20 A Well, DC-to-AC converters -- I mean, I built
11:29:16 21 an oscillator back in college. So oscillators were
11:29:21 22 well-known.
11:29:21 23 Q Do you agree with Dr. Wolfe that H-bridge
11:29:27 24 switches were well-known prior to the patents
11:29:30 25 involved in these IPRs were filed?

11:29:35 1 A I'm not so certain of that. I mean, they
11:29:40 2 were I think known.
11:29:43 3 Q All right. Why don't you pull out
11:29:46 4 Exhibit 1037 which we placed in the chat earlier
11:29:50 5 today.
11:29:50 6 (Document marked previously as
11:29:56 7 Exhibit 1037 was presented.)
11:29:56 8 A Okay.
11:30:03 9 Q Just so the record is clear, Exhibit 1037 is
11:30:12 10 a portion of a databook from Exar Corporation. This
11:30:18 11 is a document I assume you reviewed when you were
11:30:21 12 preparing your declaration?
11:30:23 13 A I believe Dr. Wolfe referred to this
11:30:28 14 document in places.
11:30:29 15 Q He did, but my question's different. I'm
11:30:34 16 asking if you looked at it when you were preparing
11:30:36 17 your declaration?
11:30:37 18 A I may have scanned through it, yes.
11:30:39 19 Q So in Exhibit 1037, there's a data sheet for
11:30:55 20 an XR-8038 device. Do you see that?
11:31:00 21 A Yes, it's a form of integrated circuit.
11:31:05 22 Q And the XR-8038 is an oscillator circuit,
11:31:10 23 right?
11:31:11 24 A It's -- I mean, it's a waveform generator.
11:31:17 25 Q So it's an oscillator circuit, right?

11:31:19 1 A Well, I mean, I would use the term waveform
11:31:25 2 generator, not oscillator.
11:31:27 3 Q Why don't we pull out -- you might want to
11:31:54 4 keep the Exar databook available to you. But the
11:31:58 5 ST Microelectronics L298, the data sheet is
11:32:05 6 Exhibit 1042. Can you pull that up, please?
11:32:23 7 A Okay.
11:32:23 8 (Document marked previously as
11:32:23 9 Exhibit 1042 was presented.)
11:32:25 10 BY MR. MILLER:
11:32:25 11 Q What's your understanding as to what the
11:32:34 12 ST L298 device is?
11:32:42 13 A I mean, it's a form of driver circuit.
11:32:47 14 Q It contains an H-bridge switch, correct?
11:32:54 15 A Essentially, yes, I believe so. I'm trying
11:33:08 16 to analyze the logic in realtime here, but I think
11:33:12 17 that basically the inputs there -- I'm looking at
11:33:17 18 the block diagram.
11:33:19 19 Q On the first page or elsewhere?
11:33:21 20 A In the first page. I'm trying to piece
11:33:29 21 through the Boolean logic here, but I gather that
11:33:34 22 depending on the inputs, the upper left and lower
11:33:40 23 right transistor would be activated or vice-versa,
11:33:44 24 and so it would alternate the sine of the output 1
11:33:50 25 and output 2, I believe.

11:33:56 1 Q And if you could pull up Exhibit 1039 which
11:34:05 2 is an excerpt from the art of electronics.
11:34:14 3 A Yes.
11:34:14 4 (Document marked previously as
11:34:14 5 Exhibit 1039 was presented.)
11:34:15 6 BY MR. MILLER:
11:34:15 7 Q Figure 3.55, which is on page 4 of
11:34:28 8 Exhibit 1039, shows a flying-capacitor voltage
11:34:35 9 inverter. Do you see that?
11:34:36 10 A Yes.
11:34:37 11 Q Okay. I'm not sure if your yes was a yes to
11:34:53 12 my question or a yes to --
11:34:55 13 A I'm trying to analyze it in realtime here.
11:34:59 14 I see the diagram, yes.
11:35:00 15 Q And what's shown in Figure 3.55 is a
11:35:07 16 flying-capacitor voltage inverter, correct?
11:35:09 17 A That's the statement. I'm a little bit
11:35:14 18 unclear how it's meaning to be operated because it's
11:35:19 19 showing the transistors as switches, which they are.
11:35:24 20 And I guess I want to interpret that -- that
11:35:35 21 certainly the -- of the lower switches, when one's
11:35:39 22 open, the other's closed. And I think what's meant
11:35:42 23 to be implied is that somehow that's reversed on the
11:35:47 24 upper set. But I can't quite see how the circuit
11:35:52 25 works exactly.

11:35:56 1 Q Let me ask you this. Prior to the filing of
11:36:04 2 the patents that are at issue in this case,
11:36:09 3 controlling the voltage supplied to a motor was
11:36:11 4 well-known, right?
11:36:13 5 A I would say so; I mean, in a generality
11:36:25 6 sense, yes.
11:36:25 7 Q And before the priority date of the patents
11:36:28 8 that are at issue in this case, controlling the
11:36:30 9 frequency of a linear motor to vibrate at a resonant
11:36:36 10 frequency was also well-known, correct?
11:36:39 11 A You'd have to show me a particular circuit
11:36:50 12 and my -- my understanding, based upon the Wolfe
11:37:01 13 report, is that the circuit for doing that presented
11:37:05 14 in the Elenga patents was patentable and novel.
11:37:12 15 There may have been other ways of doing it.
11:37:21 16 Q Well, could you -- why don't you pull up
11:37:25 17 Fukumoto for a second, Exhibit 1005.
11:37:30 18 A Okay. Yes.
11:37:32 19 Q If you go to column 16, lines 44 through 47,
11:37:54 20 I believe we talked about this sentence a little
11:37:59 21 earlier today. There Fukumoto states, "Applying a
11:38:02 22 drive signal such as" -- let me start again.
11:38:06 23 In column 16, starting at line 44 of
11:38:09 24 Fukumoto, the patent states, "Applying a drive
11:38:15 25 signal of such frequency f0 to the coil 121 causes

11:38:22 1 the main case 101 or the oscillatory actuator at 115
11:38:27 2 of the PDA 10 to resonate, thereby imparting larger
11:38:31 3 vibration to the user using small drive power."
11:38:35 4 Do you see that?
11:38:36 5 A I see the sentence, yes.
11:38:37 6 Q So this is referring to causing a linear
11:38:42 7 motor to vibrate at a resonant frequency, right?
11:38:48 8 A I believe it's a -- I mean, he discloses a
11:38:55 9 linear motor.
11:38:56 10 Q And he discloses causing that linear motor
11:39:03 11 to vibrate at a resonant frequency, right?
11:39:07 12 A Well, he says that, but he -- I mean, I read
11:39:10 13 the patent. I never saw how the drive signal is
11:39:14 14 produced.
11:39:15 15 Q Well, producing drive signals was not
11:39:26 16 exactly rocket science when the Fukumoto patent was
11:39:30 17 filed in 2001, was it?
11:39:34 18 A Well, I mean, it's electrical engineering.
11:39:39 19 I mean, I don't know if that's equivalent to rocket
11:39:42 20 science or not.
11:39:43 21 Q Well, it wasn't complicated stuff to a
11:39:45 22 POSITA, was it?
11:39:47 23 A I wouldn't make that statement generally.
11:39:52 24 You'd have to show me the circuit used to do it and
11:39:55 25 Fukumoto doesn't show it.

11:39:56 1 Q So do you think a POSITA would not be able
11:39:58 2 to do that in 2001?
11:40:02 3 A Do what?
11:40:03 4 Q Generate the signals to cause Fukumoto's
11:40:13 5 linear motor to vibrate at a resonant frequency?
11:40:17 6 A Well, I mean, an electrical engineer could
11:40:21 7 buy a waveform generator and hook it up.
11:40:23 8 Q Waveform generators were well-known in 2001,
11:40:26 9 correct?
11:40:27 10 A Well, I'm talking about a waveform -- a
11:40:30 11 bench waveform generator. I mean, making a circuit
11:40:36 12 to do that would be an inventive step.
11:40:42 13 Q Well, let's talk about some of -- what might
11:40:47 14 have been available. Why don't we pull out the Exar
11:40:50 15 data sheet that we were talking about. This is
11:40:54 16 Exhibit 1037.
11:40:56 17 A Okay. I see it.
11:41:12 18 Q So a POSITA could use, for example, the
11:41:20 19 XR-8038 to generate a signal to drive a linear
11:41:24 20 motor, correct?
11:41:27 21 A It is a waveform generator, yes.
11:41:29 22 Q And this was available in 2001, correct?
11:41:34 23 A I think so.
11:41:38 24 Q Could you go to the page 3 of the exhibit?
11:41:45 25 This is the third printing of this document and it

11:41:49 1 was in 1985. Do you see that?
11:41:51 2 A Okay.
11:41:55 3 Q Let me ask you this, in your declaration, I
11:42:00 4 believe it's in paragraph 86 -- yeah. Let me when
11:42:21 5 you get there.
11:42:28 6 A Hold on. My declaration is again what X
11:42:32 7 number?
11:42:34 8 Q 2008.
11:42:35 9 A Yeah, okay. It's in here. I got it. Yes.
11:42:39 10 Q If you could go to paragraph 86 of your
11:42:43 11 declaration.
11:42:44 12 A Uh-huh. Okay.
11:42:51 13 Q There you state that "The actual examples of
11:42:55 14 oscillator circuits and inverters that Dr. Wolfe
11:42:59 15 describes have no inputs that would permit them to
11:43:02 16 accept any inputs from a processor, let alone inputs
11:43:06 17 equivalent to those a processor would provide to an
11:43:08 18 H-bridge switch."
11:43:11 19 A Yes.
11:43:11 20 Q See that?
11:43:12 21 A Yes.
11:43:13 22 Q Now, if you could pull out the Wolfe
11:43:16 23 declaration of the '992.
11:43:29 24 A Yes.
11:43:30 25 Q And if you can go to paragraph 184 of his

11:43:34 1 declaration.
11:43:46 2 A Yes.
11:43:47 3 Q So in paragraph 184 of Dr. Wolfe's
11:43:53 4 declaration, he's testifying that he personally used
11:43:56 5 an oscillator chip called the Exar XR-8038. Do you
11:44:03 6 see that?
11:44:03 7 A Yeah, the waveform generator we were just
11:44:05 8 looking at.
11:44:06 9 Q So if you look at the XR-8038 data sheet,
11:44:10 10 Exhibit 1037, and if you can go to page 4?
11:44:20 11 A Yes.
11:44:20 12 Q If you go on the right-hand side of that
11:44:30 13 page, the Exar data sheet in the first full
11:44:40 14 paragraph there under "System Description" at the
11:44:42 15 end there says, "Supply voltage can range from
11:44:46 16 10 volts to 30 volts, or plus or minus 5 volts with
11:44:50 17 dual supplies."
11:44:51 18 Do you see that?
11:44:52 19 A Yeah, that's just saying what the chip
11:44:55 20 accepts.
11:44:57 21 Q And then he states that the -- Dr. Wolfe, I
11:45:03 22 should say, states "output amplitude swing" -- let
11:45:07 23 me start again. That's not what Dr. Wolfe says. It
11:45:09 24 says that -- the XR-8038 data sheet. Let me just
11:45:14 25 start again. I'm sorry.

11:45:16 1 At the bottom of the right-hand column of
11:45:19 2 the XR-8038 data sheet, Exar is stating that output
11:45:25 3 amplitude swing closely approaches the supply
11:45:28 4 voltage. Do you see that? It's in the last
11:45:35 5 paragraph.
11:45:37 6 A That's what the sentence says, yes.
11:45:45 7 Q So in the Exar oscillator, changing the
11:45:49 8 supply voltage would control the amplitude, correct?
11:45:54 9 A It may. I mean, depending on what the
11:46:02 10 supply voltage was, I can imagine there would be a
11:46:06 11 wide variance of what the output amplitude would be.
11:46:11 12 These chips accept a certain range of power supply
11:46:15 13 input and generally would try to produce a constant
11:46:22 14 amplitude output within that range. And that
11:46:27 15 sentence may be referring to at the extreme ranges
11:46:32 16 of amplitude, it would be limited by the supply
11:46:38 17 voltage. I mean, I'm just saying that's how I would
11:46:43 18 interpret it as an electrical engineer.
11:46:44 19 Q It doesn't say anything about extreme
11:46:47 20 voltages, right? It just says what it says, which
11:46:50 21 is that the swing voltage -- the output amplitude
11:46:55 22 swing closely approaches the supply voltage, right?
11:46:58 23 A I'd have to perform an analysis of the chip
11:47:01 24 to understand how to interpret that sentence.
11:47:05 25 Q Can you go to page 7 of the XR-8038 data

11:47:10 1 sheet which is Exhibit 1037?
11:47:17 2 A Yes.
11:47:18 3 Q On the right-hand side there, there's a
11:47:28 4 heading that says "Frequency Modulation and Sweep."
11:47:32 5 Do you see that?
11:47:32 6 A Yes.
11:47:33 7 Q And then the first full paragraph there
11:47:37 8 states that "The frequency of the waveform generator
11:47:41 9 is a direct function of the DC voltage at terminal 8
11:47:45 10 (measured from plus VCC). By altering this voltage,
11:47:50 11 frequency modulation is performed."
11:47:53 12 Do you see that?
11:47:54 13 A Yes. That's an input. It's saying that if
11:48:04 14 you -- the difference between that input and the
11:48:06 15 supply voltage determines the frequency in this
11:48:10 16 chip.
11:48:10 17 Q So a POSITA would be able to program a
11:48:20 18 processor to control the Exar oscillator by
11:48:24 19 controlling the voltage and put it at terminal 8 of
11:48:28 20 the oscillator, correct?
11:48:29 21 A Yeah, but that's not the supply voltage.
11:48:34 22 Q We're not talking about the supply voltage.
11:48:36 23 We're talking about --
11:48:37 24 A Okay, right.
11:48:38 25 Q -- the waveform generator at terminal 8 and

11:48:42 1 terminal 8.
11:48:44 2 A Okay.
11:48:45 3 Q So the answer to my question then is yes, a
11:48:50 4 processor could be configured to control the Exar
11:48:55 5 oscillator by controlling the voltage input at
11:48:58 6 terminal 8, correct?
11:48:58 7 A That's what it says.
11:48:59 8 Q And a POSITA would have known this as of the
11:49:04 9 date this was published in 1985, correct?
11:49:08 10 A Well, after reading this data sheet, yeah.
11:49:11 11 Q All right. Why don't we bring back the
11:49:31 12 linear technology data sheet, Exhibit 1042.
11:49:35 13 A Okay.
11:49:48 14 Q I'd like to draw your attention to page 6 of
11:50:05 15 Exhibit 1042.
11:50:11 16 A Okay.
11:50:11 17 Q In the bottom half there's a Figure 6. Do
11:50:16 18 you see that?
11:50:21 19 A Yes.
11:50:21 20 Q It's entitled "Bidirectional DC Motor
11:50:25 21 Control."
11:50:29 22 A Okay.
11:50:29 23 Q And on the right-hand side of Figure 6 of
11:50:34 24 Exhibit 1042 there's a table. Do you see that?
11:50:36 25 A Yes.

11:50:41 1 Q And that table is a table of functions,
11:50:48 2 correct?
11:50:50 3 A Okay.
11:50:53 4 Q Do you disagree with me?
11:50:58 5 A I'm just not exactly clear where we're going
11:51:00 6 here. Is this prior art used to -- used to support
11:51:06 7 grounds to invalidate the Elenga patents?
11:51:09 8 Q I get -- I'm going to just remind you that I
11:51:15 9 ask the questions here. So...
11:51:19 10 A Okay. I mean, well, the only reason I'm
11:51:22 11 saying is that you're -- the reason I'm performing
11:51:26 12 an analysis in realtime of these circuits is because
11:51:29 13 I was asked to evaluate the grounds for invalidity
11:51:36 14 which were based upon certain prior art that doesn't
11:51:38 15 include this.
11:51:39 16 Q Okay. Well, that is a discussion that your
11:51:44 17 lawyers can have with the Board. I get to ask you
11:51:47 18 the questions about what I want to ask you about.
11:51:50 19 And I will remind you that Dr. Wolfe did discuss
11:51:53 20 this document in his declaration, so I'm assuming
11:51:56 21 that you had analyzed it in the process of doing
11:51:58 22 your work. If you didn't, that's a different story.
11:52:02 23 A If I can clarify, he presented it as
11:52:06 24 background material. And so in terms of my analysis
11:52:11 25 of the validity of the Elenga patents, it didn't

11:52:16 1 include this.
11:52:17 2 Q Okay. Well, I'm not sure that's correct,
11:52:20 3 but that as is it may, I'm going to ask the
11:52:23 4 questions that I have.
11:52:24 5 A Okay. But I'm saying is that because this
11:52:27 6 was not presented as prior art.
11:52:31 7 Q I don't think that's correct but --
11:52:32 8 A It is correct. If you go to his -- if you
11:52:34 9 go to his --
11:52:36 10 Q Dr. Goossen, you're here to answer my
11:52:38 11 questions. Let's do that.
11:52:40 12 A Okay.
11:52:41 13 Q If you want to show up at the trial, at the
11:52:43 14 hearing and disagree with what Dr. Wolfe said,
11:52:46 15 that's for your lawyers to do. But you need to
11:52:48 16 answer my questions. Okay.
11:52:52 17 Are you looking at Figure 6 --
11:52:54 18 A Yes.
11:52:54 19 Q -- of the ST data sheet?
11:52:57 20 A Yes.
11:52:57 21 Q On the right-hand side, there's a table. Do
11:53:00 22 you see that?
11:53:01 23 A Yes.
11:53:01 24 Q And it identifies certain inputs in the
11:53:06 25 circuit that's shown on the left. Do you see that?

11:53:09 1 A Yes.
11:53:09 2 Q And then on the right-hand side, it shows a
11:53:12 3 variety of functions that will be performed
11:53:16 4 depending upon the inputs to the circuit. Do you
11:53:19 5 see that?
11:53:19 6 A Yes.
11:53:20 7 Q And the inputs that are shown are identified
11:53:31 8 as the letter C, the letter D, and Ven. Do you see
11:53:36 9 that?
11:53:37 10 A Okay.
11:53:38 11 Q The inputs C, D, and Ven are the inputs that
11:53:47 12 control the circuit shown on the left-hand side to
11:53:50 13 deliver forward and reverse power for bidirectional
11:53:55 14 DC motor control, correct?
11:53:58 15 A Okay. So yes, I believe in the diagram
11:54:07 16 what's labeled M is a motor.
11:54:09 17 Q Yeah. And there's an H-bridge in there,
11:54:12 18 correct?
11:54:12 19 A It -- I don't think of that as an H-bridge.
11:54:24 20 Those are diodes, not transistors. This is not an
11:54:38 21 H-bridge.
11:54:39 22 Q Okay. There's a power supply line Vs. Do
11:54:47 23 you see that?
11:54:47 24 A Yes.
11:54:47 25 Q And that power supply is external to this

11:54:54 1 device, correct?
11:54:55 2 A Yes.
11:55:01 3 Q And the amplitude of the output of the
11:55:03 4 circuit would be controlled by the voltage that's
11:55:06 5 input at VS, correct?
11:55:08 6 A I'm trying to interpret because I'm -- I'm
11:55:24 7 thinking that three and four are operational
11:55:29 8 amplifiers, and so I'd have to say I disagree with
11:55:38 9 that statement. I don't think changing VSS or VS
11:55:42 10 would change the amplitude of the -- of the motor
11:55:49 11 drive.
11:55:51 12 Q Okay. The Ven input, do you see that?
11:55:55 13 A Yeah.
11:55:57 14 Q That controls the frequency of the output of
11:56:03 15 this device, correct?
11:56:08 16 A I can't say that statement's true without
11:56:17 17 seeing what else is in 3 and 4.
11:56:22 18 Q Okay. Let's pull out the Horowitz and Hill
11:56:46 19 portion that we looked at which is Exhibit 1039.
11:56:52 20 A Okay. I see what this circuit is.
11:57:22 21 Q Are you looking at Horowitz and Hill?
11:57:25 22 A Yeah, Figure 3.55.
11:57:27 23 Q Well, do you have Dr. Wolfe's declaration
11:57:31 24 from the '992 proceeding in front of you?
11:57:35 25 A Yes. I have it.

11:57:51 1 Q You have it?
11:57:59 2 A Yes.
11:58:00 3 Q So here in paragraph 187, Dr. Wolfe is
11:58:10 4 testifying that Figure 3.55 is a basic design for a
11:58:20 5 voltage inverter that can be found in many
11:58:24 6 textbooks. Do you see that?
11:58:24 7 A Which paragraph are we at?
11:58:26 8 Q 187.
11:58:28 9 A Okay.
11:58:31 10 Q And this is the '992 declaration.
11:58:37 11 A Okay. And what are you asking me?
11:58:41 12 Q In paragraph 187 of his '992 declaration,
11:58:51 13 Dr. Wolfe is testifying that the diagram shown in
11:58:58 14 Figure 3.55 is a basic design for a voltage inverter
11:59:03 15 that can be found in many textbooks. Do you see
11:59:05 16 that?
11:59:06 17 A Okay.
11:59:10 18 Q So in this circuit, we see that there's a
11:59:19 19 voltage in, or Vin, in the upper left-hand corner.
11:59:23 20 Do you see that?
11:59:24 21 A Uh-huh.
11:59:24 22 Q And this is where supply voltage comes into
11:59:29 23 the device, right?
11:59:31 24 A Well, it's where Vin -- I mean, whatever Vin
11:59:37 25 is.

11:59:37 1 Q So it doesn't have to be supply voltage as
11:59:40 2 long as it's voltage, correct?
11:59:41 3 A I don't know where it came from.
11:59:44 4 Q Okay. But it's the input voltage of the
11:59:48 5 device. How about we settle on that?
11:59:52 6 A Right. Yeah, what this circuit is doing is
11:59:57 7 I think the two left-hand switches are either opened
12:00:03 8 or closed at the same time and the two right-hand
12:00:07 9 switches are either opened or closed at the same
12:00:10 10 time. And when the two left-hand switches are
12:00:12 11 closed, the two right-hand switches are opened and
12:00:15 12 vice-versa. So with the square wave at the bottom,
12:00:19 13 it produces a square wave voltage that's inverted on
12:00:29 14 the capacitor, I think.
12:00:34 15 Q So you would agree with me then that when we
12:00:37 16 see the term Vout on the right-hand side of
12:00:41 17 Figure 3.55, that it's a modified voltage because
12:00:46 18 it's either positive or negative and that's with
12:00:50 19 output of the circuit, correct?
12:00:52 20 A I guess so. I mean, it's not an H-bridge if
12:00:57 21 that's what we're getting at.
12:00:59 22 Q I didn't ask you that. In the lower
12:01:11 23 left-hand corner of the circuit, do you see there's
12:01:13 24 a wave that's input?
12:01:16 25 A Yes.

12:01:16 1 Q And that wave is --
12:01:37 2 A I mean, it's a square wave.
12:01:39 3 Q Does that input wave control the circuit
12:01:42 4 that's -- let me ask you again.
12:01:45 5 Does the wave on the left-hand side -- let
12:01:49 6 me start again. I'm sorry.
12:01:50 7 Does the input wave in the lower left of the
12:01:54 8 circuit shown in Figure 3.55 of Exhibit 1039 control
12:01:58 9 the circuit?
12:02:00 10 A No, I mean my interpretation of the circuit
12:02:06 11 is that if where that black dot is, if that's one
12:02:15 12 volt, if that's high or low depending on how the
12:02:18 13 switches are configured, both switches are closed or
12:02:21 14 open. And because of the inverter, the digital
12:02:28 15 signal is reversed and so the two right-hand
12:02:33 16 switches will be oppositely to the two left-hand
12:02:37 17 switch. So I mean, whether you call that control or
12:02:44 18 not, I don't know. It just means that's what
12:02:46 19 happens.
12:02:47 20 Q Would a POSITA be able to use a processor to
12:02:59 21 have a square wave like what we see in the lower
12:03:04 22 left-hand corner of the circuit -- let me start
12:03:10 23 again.
12:03:11 24 Would a POSITA be able to configure a
12:03:15 25 processor to have the square wave we see in the

12:03:22 1 lower left of Figure 3.55 to input that signal to
12:03:28 2 the circuit?
12:03:30 3 A Well, you don't need a processor for that to
12:03:33 4 produce a square wave.
12:03:36 5 Q But you could use a processor, is that your
12:03:39 6 testimony?
12:03:42 7 A I don't know why you would.
12:03:45 8 Q Okay. Well, I'm not really asking about
12:03:48 9 generating the square wave. But my question's a
12:03:52 10 little different, which is would a POSITA understand
12:03:58 11 that a processor could be configured to have this
12:04:03 12 square wave delivered to the circuit we see in
12:04:08 13 Figure 3.55 of Exhibit 1037?
12:04:14 14 A You're asking me to invent beyond what's in
12:04:17 15 the circuit diagram and I mean, that's a wild
12:04:22 16 hypothetical. Anything could produce that square
12:04:24 17 wave.
12:04:27 18 Q I'm not talking about producing it. I'm
12:04:28 19 asking controlling something to have it delivered.
12:04:32 20 A All I see is a square wave.
12:04:35 21 Q Okay. I'm going to mark a new exhibit. I'm
12:04:39 22 going to put it in the chat. And I believe it's
12:04:42 23 going to be Exhibit 1043.
12:04:42 24 (Exhibit 1046 marked for
12:05:23 25 identification.)

12:05:23 1 BY MR. MILLER:
12:05:23 2 Q Let me know when you've been able to
12:05:25 3 download it.
12:05:27 4 A Which number?
12:05:29 5 MR. RUBIN: Counsel, there's already an
12:05:33 6 Exhibit 1043 in the IPRs, I think.
12:05:39 7 MR. MILLER: Do you know what exhibit the
12:05:41 8 last one -- I had 1042, but maybe I'm wrong.
12:06:01 9 MR. RUBIN: So I think 1043 is related to
12:06:08 10 the stipulations.
12:06:10 11 MR. MILLER: Why don't we go off the record.
12:06:12 12 I'll go into PTAB and see what it is. Why don't we
12:06:16 13 just take a short break.
12:06:18 14 (Short recess.)
12:07:30 15 BY MR. MILLER:
12:07:49 16 Q Okay. We marked as Exhibit 1046 a statement
12:07:55 17 from Wikipedia entry for H-bridge. Do you see that?
12:08:02 18 A I see a document marked "H-bridge." Is that
12:08:04 19 what you want me to do?
12:08:07 20 Q I'm not sure what you're asking me. Do you
12:08:10 21 have Exhibit 1046 open?
12:08:12 22 A I don't see 1046. I see a PDF labeled
12:08:16 23 "H-bridge.pdf."
12:08:20 24 Q Yeah, that's the one. We're going to mark
12:08:21 25 that as Exhibit 1046, but as the court reporter

12:08:25 1 stated while we were off the record, that doesn't
12:08:28 2 until we're done here.
12:08:29 3 A Okay, I have it.
12:08:30 4 Q The second paragraph -- well, let me start
12:08:51 5 at the top.
12:08:53 6 So the first paragraph of this Wikipedia
12:08:55 7 entry states that "An H-bridge is an electronic
12:08:58 8 circuit that switches the polarity of a voltage
12:09:01 9 applied to a load. These circuits are often used in
12:09:05 10 robotics and other applications to allow DC motors
12:09:08 11 to run forwards or backwards."
12:09:10 12 Do you see that?
12:09:10 13 A Yes.
12:09:11 14 Q And there's a footnote there, footnote 1.
12:09:27 15 Do you see that?
12:09:29 16 A At the bottom, you mean? Where am I looking
12:09:34 17 for the footnote?
12:09:35 18 Q The portion that I read for you ends in
12:09:38 19 footnote 1. Do you see that?
12:09:39 20 A Yes.
12:09:40 21 Q And if you go to the second-to-last page
12:09:42 22 where the references are, you can see that the
12:09:45 23 Wikipedia entry is referring to a paper from 2002.
12:09:51 24 Do you see that?
12:09:52 25 A Yes.

12:09:53 1 Q Great. And the next paragraph in Wikipedia
12:09:59 2 states, "Most DC-to-AC converters (power inverters),
12:10:08 3 most AC/AC converters, the DC-to-DC push-pull
12:10:13 4 converter, isolated DC-to-DC converter, most motor
12:10:17 5 controllers, and many other kinds of power
12:10:19 6 electronics use H-bridges."
12:10:22 7 Do you see that?
12:10:22 8 A Yes.
12:10:23 9 Q So it's true, is it not, that POSITAs would
12:10:42 10 understand that H-bridges are commonly used in
12:10:48 11 DC-to-AC applications?
12:10:54 12 A Well, I mean, based on that statement?
12:11:00 13 Q Well, let's start divorced from that
12:11:02 14 statement first. Do you agree that H-bridges were
12:11:08 15 commonly used before the patents involved in these
12:11:11 16 IPR trials priority date and they were commonly used
12:11:17 17 in DC or -- DC-to-AC applications?
12:11:22 18 A Well, they existed.
12:11:24 19 Q Can you answer my question yes or no,
12:11:28 20 please?
12:11:29 21 A No.
12:11:29 22 Q Prior to the --
12:11:30 23 A I don't know if I would agree with the word
12:11:32 24 common, but they existed.
12:11:36 25 Q The POSITAs knew about them, correct? Let

12:11:46 1 me start again.
12:11:47 2 Prior to the priority date of the
12:11:49 3 applications -- let me start again.
12:11:53 4 Prior to the priority date of the patents
12:11:56 5 that are involved in the IPR trials we're involved
12:11:59 6 in here today, POSITAs would have known that
12:12:03 7 H-bridges could be used to convert DC power to AC
12:12:11 8 power, correct?
12:12:12 9 A Well, I mean, there's a lots of ways to
12:12:23 10 produce DC-to-AC conversion. I don't even think the
12:12:30 11 H-bridge would have been the most common way. So I
12:12:41 12 mean, it's one way of doing it.
12:12:45 13 Q And it was a known way, correct?
12:12:48 14 A It was known, yes.
12:12:50 15 Q Do you agree with the statement in the
12:13:01 16 Wikipedia entry that states most DC-to-AC converters
12:13:09 17 used H-bridges?
12:13:12 18 A I don't really know. I'm just saying that I
12:13:16 19 knew of lots of different ways of doing that and I
12:13:19 20 think most POSITAs would also.
12:13:23 21 Q How many ways were there to do it?
12:13:24 22 A Well, I mean, you could make all kinds of
12:13:27 23 circuits. But particularly, you know, it depends on
12:13:35 24 what kind of AC output you wanted. It's saying
12:13:39 25 power inverters. I mean, I wouldn't use an H-bridge

12:13:43 1 to make a power inverter. I mean, it would produce
12:13:46 2 something -- it would produce a square wave very
12:13:51 3 much unlike, you know, what you desire for power
12:13:54 4 which is a sine wave. So you know, I guess I do
12:14:02 5 disagree with at least the first part of that
12:14:04 6 statement.
12:14:04 7 Q Okay.
12:14:06 8 A Especially inasmuch as they included the
12:14:09 9 parenthetical power inverter.
12:14:12 10 Q Do you have an understanding of what the
12:17:05 11 term "magnitude" means?
12:17:09 12 A I think so, although it may have different
12:17:12 13 meaning depending on what situation it's applied to.
12:17:16 14 Q Okay. Can you provide me with what you
12:17:20 15 understand -- what the term "magnitude" means?
12:17:26 16 A The dictionary definition? I mean --
12:17:28 17 Q As you sit here today how you understand it?
12:17:32 18 A Generally how large something is.
12:17:34 19 Q In the context of the patents involved in
12:17:50 20 these IPR proceedings, is a magnitude -- does it
12:17:54 21 have a value?
12:17:57 22 A Can you point me to a particular passage in
12:18:00 23 the patents so I can provide you a contextual
12:18:03 24 answer?
12:18:04 25 Q I'm just trying to get your understanding.

12:18:06 1 So you said that. Generally speaking, the word
12:18:08 2 magnitude refers to how large something is, right?
12:18:13 3 A I think that's the dictionary definition.
12:18:15 4 Q Yeah. And let's stick with that. So can
12:18:22 5 the magnitude of something have a value?
12:18:28 6 A I suppose it could be quantified, yes.
12:18:32 7 Q Can this value that's assigned to the
12:18:50 8 magnitude of something be an integer?
12:18:53 9 A Well, I don't know unless you're telling me
12:19:06 10 what we're referring to as having a magnitude. I
12:19:10 11 mean, the magnitude would usually -- I mean, in the
12:19:21 12 general usage of the term "magnitude," it would
12:19:23 13 refer to something that might have a continuous
12:19:26 14 range of values.
12:19:29 15 Q Okay. And could those continuous range of
12:19:38 16 values include integers?
12:19:41 17 A Well --
12:19:45 18 MR. RUBIN: Objection, form.
12:19:47 19 A I mean, if it were a continuous range, it
12:19:52 20 would not be integer.
12:19:58 21 Q I'm just trying to understand. You
12:20:04 22 testified when I asked you can this value that's
12:20:12 23 assigned to the magnitude of something be an
12:20:14 24 integer, you said that in general usage of the term
12:20:19 25 magnitude, it would refer to something that might

12:20:21 1 have a continuous range of values. And my question
12:20:24 2 to you is could this continuous range of values
12:20:27 3 include an integer?
12:20:29 4 MR. RUBIN: Objection, form.
12:20:31 5 A I'm not certain I can answer that question
12:20:37 6 except inasmuch as usually I mean integers aren't a
12:20:42 7 continuous range.
12:20:45 8 Q I understand. But --
12:20:46 9 A I mean, if you have integers 1, 2, 3 and 4
12:20:50 10 describing the magnitude, that would not include
12:20:53 11 2.36.
12:20:54 12 Q Correct. But if you had a range of values
12:20:57 13 going from 1.86, 1.88, 1.89, 1.90, 1.91, 1.92, 1.93,
12:21:10 14 1.94, 1.95, 1.96, 1.97, 1.98, 1.99, 2.00, 2.1,
12:21:22 15 et cetera, et cetera, that range would include an
12:21:26 16 integer, would it not?
12:21:29 17 A The set of numbers you just listed include
12:21:34 18 an integer, 2.
12:21:37 19 Q Yes, that's my question.
12:21:39 20 A I still don't understand what the question
12:21:41 21 is. You're saying can you describe a magnitude with
12:21:46 22 only integers. And I think the answer -- my answer
12:21:50 23 is no.
12:21:51 24 Q Yeah, that's not my question. My question
12:21:53 25 is that you said -- you testified today that the

12:22:01 1 magnitude could include a continuous range. And my
12:22:04 2 question was could this continuous range include an
12:22:09 3 integer? My question was not whether it had to be
12:22:13 4 comprised solely of integers.
12:22:18 5 A I mean, it would -- depending on the
12:22:26 6 measurement system you're using, the magnitude could
12:22:29 7 happen to fall upon an integer value.
12:22:31 8 Q Thank you. Can you pull up Ueda, please.
12:22:36 9 This is Exhibit 1008.
12:22:58 10 A Yes.
12:22:58 11 (Document marked previously as
12:22:58 12 Exhibit 1008 was presented.)
12:22:58 13 BY MR. MILLER:
12:22:58 14 Q I take it you've reviewed Ueda in the past
12:23:01 15 in preparing your declaration in this case?
12:23:03 16 A Yes.
12:23:26 17 Q Could I direct your attention, please, to
12:23:28 18 paragraph 149 of Ueda? Let me know when you get
12:23:46 19 there.
12:23:49 20 A 149?
12:23:50 21 Q Yes.
12:23:51 22 A Okay. Yes.
12:23:55 23 Q And paragraph 149, it's part of a longer
12:24:04 24 discussion describing Figure 4a in Ueda, right?
12:24:09 25 A If you say so, yes. Yeah, I believe

12:24:23 1 Figure 4a this whole column is referring to.
12:24:27 2 Q And if you look at Figure 4a, there's a
12:24:29 3 number of components there shown. There's a driving
12:24:31 4 voltage determining unit 7. Do you see that?
12:24:39 5 A Yes.
12:24:39 6 Q And there's an order output determining
12:24:43 7 unit 3. Do you see that?
12:24:44 8 A Okay.
12:24:57 9 Q And there's an output detector 4. Do you
12:25:00 10 see that?
12:25:01 11 A Yes.
12:25:01 12 Q Output detector is connected to the linear
12:25:06 13 vibration motor 100. Do you see that?
12:25:10 14 A Well, it accepts a value from it, yes.
12:25:22 15 Q In fact, if you look in paragraph 149, the
12:25:37 16 way to describes that it -- that an amplitude value
12:25:46 17 of the AC voltage Vd to be supplied from the motor
12:25:51 18 driver 1a to the linear vibration motor 100. Do you
12:25:57 19 see that?
12:25:57 20 A Yes.
12:25:57 21 Q So the linear vibration motor outputs a
12:26:03 22 signal, right?
12:26:08 23 A Somehow there is a signal from it. I can't
12:26:18 24 recall what the mechanism was.
12:26:23 25 Q And that signal goes into an output

12:26:26 1 detector 4, correct?
12:26:28 2 A That's what's written.
12:26:30 3 Q And this amplitude value, it's determined by
12:27:07 4 the driving voltage determining unit 7 on the basis
12:27:12 5 of a result of a comparison between the magnitude of
12:27:16 6 the order output indicated by the output order
12:27:20 7 signal Oop and the magnitude of the detection output
12:27:24 8 indicated by the output detection signal Dop. Do
12:27:29 9 you see that?
12:27:29 10 A I see those words, yes.
12:27:31 11 Q What's compared there?
12:27:37 12 A What's compared is the magnitude of the
12:27:42 13 order output and the detection output determining
12:27:50 14 basically the output of the motor itself.
12:27:52 15 Q Is that the signals Dop and Oop?
12:28:00 16 A That's my interpretation, yes.
12:28:02 17 Q Would a POSITA understand that the signal
12:28:21 18 Dop is a digital signal or an analog signal?
12:28:27 19 A I think analog.
12:28:31 20 Q Why do you think that?
12:28:32 21 A Well, it's -- I mean, I'd have to read
12:28:39 22 through this carefully again, but it would be some
12:28:42 23 sort of sensor output.
12:28:45 24 Q What about the signal Oop, do you believe
12:28:52 25 that would be an analog signal or a digital signal?

12:28:55 1 A I think analog.
12:28:57 2 Q Why do you think that?
12:28:59 3 A Well, if it's comparing with a sensor output
12:29:03 4 which is analog, it would also be analog.
12:29:06 5 Q So in -- if you look at Figure 4b which is
12:29:48 6 immediately below Figure 4a --
12:29:55 7 A Yes.
12:29:56 8 Q -- the way this -- paragraphs 178 through
12:30:19 9 180 describe Figure 4b. Do you see that?
12:30:23 10 A Okay. I have to keep going back and forth.
12:30:27 11 Q I apologize.
12:30:28 12 A That's okay. 178 again?
12:30:30 13 Q 178 through 180.
12:30:33 14 A Okay. Yes.
12:30:38 15 Q So the detected output from the linear
12:30:47 16 vibration motor is Dop, right?
12:30:58 17 A I don't see that there. Dop was in the
12:31:07 18 previous embodiment. I don't know if it carries
12:31:09 19 through or not.
12:31:10 20 Q Okay. Well, let's focus on Figure 4a then.
12:31:14 21 So detected output is the signal Dop, correct? And
12:31:27 22 when I say detected output, I'm talking about the
12:31:29 23 signal detected from the linear vibration motor.
12:31:32 24 A Right. Yes.
12:31:37 25 Q So that detected output, that's the signal

12:31:39 1 Dop, correct?
12:31:41 2 A That's my belief, yes.
12:31:42 3 Q And then the required or the desired motor
12:31:45 4 output is the signal Oop that's output by the order
12:31:50 5 output determining unit, correct?
12:31:52 6 A Yes.
12:31:55 7 Q Okay. How does the way to determine whether
12:31:59 8 the detected output is smaller or larger than the
12:32:02 9 required output?
12:32:05 10 A Well, Dop and Oop are compared in box 7.
12:32:13 11 Q And the output of box 7 is a value, right?
12:32:16 12 A Yes.
12:32:27 13 Q Would you agree with me that one way of
12:32:34 14 describing a value is that it's a numerical quantity
12:32:40 15 that's assigned or determined by calculation or
12:32:44 16 measurement?
12:32:47 17 MR. RUBIN: Objection, form.
12:32:48 18 A I mean, I don't know what's in box 7 and
12:32:54 19 there could be many different ways of performing the
12:32:59 20 comparison of Dop and Oop and many different ways of
12:33:06 21 outputting that comparison depending on the
12:33:07 22 application.
12:33:09 23 Q Would one way of doing that comparison be by
12:33:13 24 converting Dop and Oop into digital signals and
12:33:20 25 then --

12:33:22 1 A That's not what's shown here.
12:33:24 2 Q I'm not saying whether it's shown or not.
12:33:27 3 I'm just asking you if that's one way to do it?
12:33:30 4 A I don't know. I'd have to see the circuit
12:33:36 5 to understand whether it would work or not.
12:33:38 6 Q As you sit here today, do you have an
12:33:51 7 understanding as to what the term "value" means?
12:33:54 8 A You mean some sort of signal level?
12:34:00 9 Q Is that your answer?
12:34:01 10 A Well, in this -- is that what you -- I think
12:34:05 11 that's what you mean.
12:34:09 12 Q Well, I'm not asking what I mean. I'm
12:34:11 13 asking what you -- what's your -- as you sit here
12:34:14 14 today, your understanding as to what the term
12:34:17 15 "value" means?
12:34:19 16 A A quantification of something.
12:34:22 17 Q Is an integer a numerical quantity? Let me
12:34:43 18 start again.
12:34:43 19 Is an integer a quantification of something?
12:34:47 20 A It's an incomplete quantification of
12:34:50 21 something.
12:34:50 22 Q What do you mean by an incomplete
12:35:26 23 quantification?
12:35:27 24 A Well, I mean, depending on what measurement
12:35:30 25 units were used, the value could have a quantity of

12:35:37 1 2.36 which would not be integer. So if you only
12:35:43 2 used integers, you wouldn't include -- it would be
12:35:46 3 incomplete.
12:35:47 4 Q Okay. Thank you.
12:35:55 5 Does Ueda perform measurements and
12:35:59 6 calculations to arrive at the driving voltage for
12:36:04 7 the motor?
12:36:10 8 A Well, it's comparing Dop and Oop in order to
12:36:18 9 determine how to drive the motor to get the desired
12:36:24 10 value.
12:36:25 11 Q So that's a calculation, correct?
12:36:29 12 A Well, the comparison?
12:36:31 13 Q Yes.
12:36:32 14 A That would generally be done in some sort of
12:36:36 15 hard-wired circuit like a comparator.
12:36:39 16 Q That's not a calculation or it is a
12:36:42 17 calculation?
12:36:43 18 A Well, I mean, it's --
12:36:45 19 Q -- circuit --
12:36:48 20 A It's just a circuit.
12:36:51 21 Q So in your opinion, that's -- when you use
12:36:53 22 the comparator, that's not a calculation?
12:36:57 23 A I mean, there's no math involved. It's just
12:37:01 24 the circuit senses whether one input is lower than
12:37:07 25 the other.

12:37:11 1 Q In your opinion, that's not a calculation?
12:37:19 2 A I guess I personally wouldn't describe it as
12:37:24 3 such.
12:37:25 4 Q Would you do such a comparison -- let me ask
12:37:34 5 -- let me ask you this. Sorry. Let me start again.
12:37:36 6 If you compare Dop to Oop using a
12:37:44 7 comparator, would you get only a binary output?
12:37:54 8 A I mean, it depends on how that driving
12:38:02 9 voltage determining unit works. You'd have to show
12:38:06 10 me that circuit.
12:38:07 11 Q Did you try to figure that out when you were
12:38:09 12 doing your work in this case?
12:38:12 13 A I'm not -- point me to --
12:38:16 14 Q I get that.
12:38:18 15 A -- in my declaration where this has come up.
12:38:20 16 Q I'm asking if you did it. If you didn't,
12:38:22 17 that's fine. If you did, that's fine. But I just
12:38:25 18 need to know if you did.
12:38:27 19 A I can't recall if I did.
12:38:29 20 Q Thank you. Let me ask you this, is the
12:38:33 21 number 1 a value?
12:38:36 22 A It is a value, yes.
12:38:39 23 Q Is the number 1.5 a value?
12:38:41 24 A Yes.
12:38:43 25 Q Is the number 2 a value?

12:38:45 1 A Yes.
12:38:45 2 Q So a value can include -- let me start
12:38:52 3 again.
12:38:53 4 So the number 1, that's an integer, right?
12:38:55 5 A Yes.
12:38:56 6 Q The number 1.5 is not an integer, correct?
12:39:00 7 A Correct.
12:39:01 8 Q And the number 2 is an integer, correct?
12:39:04 9 A Yes.
12:39:04 10 Q So values can encompass both integers and
12:39:11 11 non-integers, correct?
12:39:14 12 A They do generally encompass both.
12:39:19 13 Q Is the number 1.1 a value?
12:39:25 14 A Yes.
12:39:25 15 Q And I take it that the number 1.1 is not an
12:39:30 16 integer, is that right?
12:39:32 17 A Correct.
12:39:32 18 Q Is 1. -- is -- let me start again.
12:39:39 19 Would you consider a measurement of
12:39:48 20 1.1 micrometers to be a value?
12:39:49 21 A Yes. I mean, it's a measurement. I mean...
12:39:53 22 Q If the measurement results in 1.1, would you
12:39:57 23 consider that to be a value?
12:40:00 24 A Sure.
12:40:05 25 Q Okay. Is the value of 1.1 micrometers an

12:40:18 1 integer?
12:40:19 2 A 1.1 is not an integer.
12:40:22 3 Q 1.1 micrometers would not be an integer
12:40:27 4 either, correct?
12:40:27 5 A Well, I mean, no, 1.1 is not an integer.
12:40:32 6 Q Okay. Is 1,100 nanometers a value?
12:40:38 7 A I mean, by value, you -- you know, a value
12:40:47 8 can encompass all kinds of things. I mean, you can
12:40:50 9 talk about value is how valuable is my car, you
12:40:54 10 know. So in terms of its usage, I think that to
12:41:06 11 answer some of these questions, I might need to
12:41:10 12 understand what we're talking about the value of.
12:41:16 13 Q Well, here --
12:41:17 14 A What is it?
12:41:18 15 Q It's not complicated. I just asked you
12:41:22 16 would a measurement of 1,100 nanometers be a value?
12:41:27 17 A It would be whatever it is. Whether you
12:41:34 18 called it a value or not, I'm not sure.
12:41:37 19 Q Would 1,100 nanometers be considered an
12:41:44 20 integer?
12:41:45 21 A 1,100 is an integer.
12:41:48 22 Q Are 1.1 micrometers and 1,100 nanometers the
12:41:56 23 same value?
12:41:59 24 A No. I mean, because the word value implies
12:42:03 25 you've determined what the measurement unit is. So

12:42:12 1 I wouldn't say they're equivalent because I would
12:42:14 2 say that the term value has to -- I mean, you know,
12:42:20 3 if you told me my car was worth 147,000, okay, I
12:42:26 4 wouldn't know how valuable it was unless you told me
12:42:29 5 147,000 of what, right. So I cannot describe
12:42:35 6 something as being the same value in two different
12:42:37 7 units.
12:42:39 8 Q So as you sit here today, you can't tell me
12:42:46 9 if 1.1 micrometers and 1,100 nanometers are the same
12:42:51 10 value?
12:42:53 11 A They're equal distances.
12:42:58 12 Q Would you agree with me that a value can be
12:43:08 13 an integer using one scale and a non-integer using
12:43:12 14 another scale?
12:43:16 15 A You mean -- not the word scale? You mean
12:43:21 16 measurement unit.
12:43:22 17 Q We can use measurement unit but -- if you
12:43:27 18 like.
12:43:27 19 A A scale is a different thing.
12:43:34 20 Q Okay. So would you agree with me that a
12:43:40 21 value could be an integer using one measurement unit
12:43:44 22 and a non-integer using another measurement unit?
12:43:52 23 A Okay. I mean, you'd have to tell me what
12:43:55 24 the measurement units were.
12:43:56 25 Q Why don't we talk about nanometers versus

12:43:59 1 micrometers?
12:44:01 2 A Okay.
12:44:01 3 Q So the distance represented by the
12:44:08 4 measurement scale of 1.1 micrometers and the
12:44:17 5 distance using -- the same distance using nanometers
12:44:23 6 have different values, but they represent the exact
12:44:27 7 same thing, correct?
12:44:30 8 A 1,100 nanometers and 1.1 microns are the
12:44:34 9 same distance.
12:44:35 10 Q So for example, 1.1 micrometers and
12:45:11 11 1,100 nanometers mean the same thing, correct?
12:45:17 12 A Again, I'll -- I can only state what I
12:45:25 13 absolutely know to be true, which is that
12:45:28 14 1,100 nanometers and 1.1 microns are the same
12:45:32 15 distance.
12:45:42 16 Q Okay. Why don't you take out your
12:46:16 17 declaration?
12:46:30 18 A Yes.
12:46:31 19 Q Let me -- okay. Sorry. Before I do that,
12:46:40 20 would you say that half a dollar and 50 cents
12:46:45 21 represent the same thing?
12:46:46 22 A They are the same amount of money.
12:46:49 23 Q And half a dollar is not an integer,
12:46:53 24 correct?
12:46:54 25 A In the units of dollars.

12:47:05 1 Q In the units of dollars what?
12:47:08 2 A It's not an integer.
12:47:10 3 Q But one dollar is an integer, correct?
12:47:13 4 A In the units of dollars, one dollar is an
12:47:16 5 integer.
12:47:16 6 Q Thank you. All right. Going back to your
12:47:18 7 declaration -- I'm sorry. Could we go off the
12:47:38 8 record for a second? Someone's trying to -- I have
12:47:42 9 a 10:00 meeting that I need to cancel. So why don't
12:47:45 10 we take a break. I don't think we have too much
12:47:46 11 more to go.
12:47:48 12 (Short recess.)
12:55:25 13 BY MR. MILLER:
13:03:34 14 Q Can you pull up your declaration, please
13:03:42 15 which is Exhibit 2008?
13:03:43 16 A Yes, I have it.
13:03:44 17 Q Great. And if you could please go to
13:03:49 18 paragraph 118.
13:03:59 19 A Yes.
13:04:00 20 Q In paragraph 118 of your declaration, you
13:04:06 21 opine that "In order to fit Erixon's tube-shaped
13:04:11 22 vibrator into the Fukumoto Figure 3 PDA without
13:04:15 23 substantially increasing the thickness of the
13:04:18 24 device, the direction of vibration would be oriented
13:04:21 25 parallel to the screen, not perpendicular, resulting

13:04:25 1 in a haptic sensation very different from" pressing
13:04:28 2 -- "that of pressing a button." Correct?
13:04:32 3 A Yes.
13:04:32 4 Q So in your opinion -- let me start again.
13:04:44 5 In your opinion -- I'm going to start again. I'm
13:04:52 6 sorry.
13:04:52 7 So in your opinion, your opinion is that you
13:04:57 8 could not physically incorporate the motor of Erixon
13:05:01 9 into the PDA of Fukumoto because of the sizes of the
13:05:04 10 motor in the PDA, correct?
13:05:08 11 MR. RUBIN: Objection, form.
13:05:08 12 A Well, inasmuch as Erixon's vibrator is akin
13:05:19 13 to be -- having the major length along the axis of
13:05:29 14 the device, yes.
13:05:30 15 Q So when you were arriving at this opinion,
13:05:43 16 how did you determine the thickness of Fukumoto's
13:05:47 17 PDA?
13:05:51 18 A Oh. Well, I mean, I generally thought that
13:06:01 19 it was a similar thickness to handheld devices
13:06:07 20 generally.
13:06:11 21 Q Did you determine the thickness based on
13:06:14 22 anything in Fukumoto?
13:06:20 23 A No.
13:06:20 24 Q How did you determine the length of the
13:06:26 25 motor in Erixon?

13:06:32 1 A I did not.
13:06:33 2 Q In paragraph 129 of your declaration, you
13:06:42 3 opine that "In order to fit Fuller's tube-shaped
13:06:48 4 electromagnetic vibrator into the Fukumoto Figure 3
13:06:52 5 PDA without substantially increasing the thickness
13:06:55 6 of the device, the direction of vibration would be
13:06:58 7 oriented parallel to the screen, not perpendicular,
13:07:02 8 resulting in a haptic sensation very different from
13:07:05 9 that of pressing of a button." Correct?
13:07:08 10 A Yes.
13:07:09 11 Q So your opinion is that you could not
13:07:13 12 physically incorporate the motor of Fuller into the
13:07:16 13 PDA of Fukumoto because of the sizes of the motor
13:07:22 14 and the PDA, correct?
13:07:23 15 MR. RUBIN: Objection, form.
13:07:24 16 A Just inasmuch as the Fuller aspect ratio is
13:07:30 17 such that the long axis is in the direction of the
13:07:35 18 travel of the magnet, my analysis was that it would
13:07:45 19 generally have to be mounted with that axis parallel
13:07:50 20 to the screen to fit.
13:07:55 21 Q Erixon and Fuller utilized two springs to
13:08:06 22 increase vibration strength, correct?
13:08:14 23 A Well, that's just their design because it's
13:08:23 24 a tube-shaped housing so it requires springs on both
13:08:30 25 sides.

13:08:31 1 Q So the answer to my question is yes?
13:08:35 2 A To increase what again? I'm sorry.
13:08:37 3 Q Vibration strength.
13:08:40 4 A I don't know that I understand that. I'd
13:08:44 5 have to review Fuller and Erixon.
13:08:46 6 Q You didn't make that determination when you
13:08:49 7 were drafting your declaration?
13:08:51 8 A I made the determination that if two springs
13:08:54 9 were added to Fukumoto, it would not generally
13:08:59 10 result in a decrease of power for the same
13:09:06 11 vibration.
13:09:06 12 Q Okay. I guess but does -- Fukumoto has an
13:09:16 13 embodiment with two springs, correct?
13:09:19 14 A The electrostatic embodiment, yes.
13:09:23 15 Q That's the fifth modification of the first
13:09:26 16 embodiment?
13:09:26 17 A I believe so. You'd have to -- I'd have to
13:09:30 18 look through Fukumoto to make sure.
13:09:32 19 Q Well, why don't you pull out Fukumoto.
13:09:41 20 A Okay. Do you have the number again? I'm
13:09:46 21 sorry.
13:09:46 22 Q I think it's 1005, but let me double-check.
13:09:50 23 A Yeah, it is.
13:10:24 24 Q All right. So in Exhibit 1005, which is
13:10:29 25 Fukumoto, you had mentioned that Figure 83

13:10:36 1 embodiment, I believe, right?
13:10:41 2 A Yes.
13:10:42 3 Q And in the Figure 83 embodiment, there's --
13:10:52 4 there are springs on either side of element 813,
13:10:57 5 correct?
13:10:59 6 A Yes, there kind of has to be in an
13:11:04 7 electrostatic embodiment like that.
13:11:07 8 Q Could you go to column 48 of Fukumoto?
13:11:24 9 A Yes.
13:11:27 10 Q You'll see around line 53, there's a heading
13:11:31 11 "Modification 5."
13:11:33 12 Do you see that?
13:11:33 13 A Yes.
13:11:34 14 Q And modification 5 is the two-spring
13:11:40 15 embodiment, right?
13:11:41 16 A Right. Well, modification 5, referring to
13:12:30 17 Figure 82, starts in the second paragraph of
13:12:33 18 column 49 where it's referring to the electrostatic
13:12:36 19 version.
13:12:38 20 Q And then it continues to the bottom of 49
13:12:41 21 and talks about Figure 83, correct?
13:12:44 22 A I believe so.
13:12:49 23 Q Yeah. Fukumoto discusses the use of two
13:13:05 24 springs to increase vibration strength in that fifth
13:13:09 25 modification?

13:13:10 1 A Where do you see that?
13:13:12 2 Q You don't agree with that statement?
13:13:14 3 A Where are you reading that?
13:13:16 4 Q I'm just asking you, does Fukumoto describe
13:13:21 5 use of two springs to increase vibration strength?
13:13:26 6 A It may increase the force required, but I
13:13:39 7 mean, in terms of vibrations delivered -- the
13:13:45 8 vibration strength delivered to the screen, it would
13:13:48 9 actually be less, right, because it's delivered in
13:13:51 10 both directions.
13:14:30 11 Q Does the number of springs, i.e., one spring
13:14:39 12 or two springs, have an impact on the size of the
13:14:43 13 motor that would be required to move a movable
13:14:50 14 element?
13:14:50 15 A You mean the coil -- well, in this case the
13:14:54 16 voltage?
13:14:55 17 Q Yes.
13:14:57 18 A Well, yes. And actually, with these
13:15:05 19 electrostatic versions, if you didn't have two sets
13:15:07 20 of springs, it might snap to the electrode and short
13:15:13 21 out. So that was my interpretation of why it had
13:15:24 22 two springs.
13:15:31 23 Q Fukumoto talks -- in the Figure 83
13:15:34 24 embodiment talks about having counter-electrodes, is
13:15:38 25 that right?

13:15:38 1 A Well, I mean, he -- when one's plus the
13:15:42 2 other's minus, et cetera.
13:15:51 3 Q And in column 50 of Fukumoto, around line 9,
13:16:02 4 I guess, the reference states, "Therefore, compared
13:16:07 5 with the oscillator actuator 800 shown in" 82 --
13:16:11 6 "Figure 82, the electrostatic force for causing the
13:16:15 7 moveable weight 813 to reciprocate becomes double
13:16:17 8 and a greater vibration can be generated."
13:16:20 9 Do you see that?
13:16:20 10 A Yes, and I think it's difficult to compare
13:16:24 11 the electrostatic version and the electromagnetic
13:16:28 12 version here. And additionally, I'm not sure if
13:16:33 13 that sentence makes sense because half of the
13:16:37 14 vibration would be conveyed to the back of the unit,
13:16:41 15 not to the screen.
13:17:09 16 Q So sorry if I asked this already. If you
13:17:14 17 were to use two springs in the magnetic version,
13:17:18 18 would that allow you to use a smaller motor or not,
13:17:22 19 in your opinion?
13:17:24 20 A Well, it depends on how they were designed,
13:17:27 21 right. And when you say smaller, you mean a smaller
13:17:31 22 coil or smaller input power to the coil?
13:17:36 23 Q I'm talking about the size of the motor, not
13:17:39 24 the size of the current.
13:17:43 25 A Oh, I don't think so because you'd have the

13:17:47 1 space required for the additional spring.
13:17:52 2 Q So the spring might take up additional
13:17:57 3 space. My question's different. I'm not talking
13:17:59 4 about the overall size of the actuator. I'm talking
13:18:02 5 about the size of the motor itself.
13:18:05 6 A The coil?
13:18:06 7 Q Yes.
13:18:11 8 A I would find it difficult to answer that
13:18:16 9 question. Again, I lean back on my understanding of
13:18:22 10 physics and if you double the force, it will double
13:18:27 11 the power. So the coil would probably have to be
13:18:32 12 bigger, not smaller.
13:18:33 13 Q What if you used smaller springs?
13:18:36 14 A I mean, again, I mean F -- you know, the our
13:18:47 15 power is force times distance and so -- our energy
13:18:55 16 is force times distance, so power is force times
13:18:57 17 velocity. And I think that if you have higher
13:19:04 18 force, you're going to have to require higher power
13:19:09 19 which is sort of a simple statement anyway. So if
13:19:23 20 by doubling the number of springs, you double the
13:19:25 21 force required, you're doubling the power required.
13:19:28 22 Q That assumes strength of springs are the
13:19:31 23 same as what was -- let me start again.
13:19:35 24 That assumes that the springs are the same
13:19:38 25 in the two-spring embodiment as the spring in the

13:19:42 1 single-spring embodiment, right?
13:19:45 2 A Well, I mean, why else would you do it?
13:19:51 3 Q You could have smaller springs, springs with
13:19:55 4 less -- that would create less force, right?
13:19:59 5 A I mean, to a certain extent, you're asking
13:20:01 6 me to invent here and come up with conclusions based
13:20:05 7 upon, you know, inventing a structure and a coil
13:20:10 8 different than what's shown in the patent because
13:20:17 9 the patent doesn't even show a magnetic version with
13:20:22 10 two springs. I mean, I'm not trying to be
13:20:25 11 difficult. I'm just saying it would be very
13:20:27 12 difficult for me to analyze a version with two
13:20:29 13 springs in Fukumoto's magnetic version.
13:20:37 14 Q Do you disagree with Fukumoto in column 50
13:20:40 15 where he says that its two-spring embodiment
13:20:56 16 generates greater vibration?
13:20:59 17 A Look, I don't necessarily disagree with
13:21:03 18 that. But I mean, it's sort of -- what would happen
13:21:08 19 is that half of the vibration would be delivered to
13:21:11 20 the back of the case, right, not to the screen which
13:21:16 21 is where you want it.
13:21:17 22 So in a sense, I mean, yeah, you could
13:21:21 23 double the total vibration, but you'd only get half
13:21:24 24 of it on the screen so the vibration would not
13:21:27 25 change. Yet by doubling the force, you would double

13:21:30 1 the power required. So it kind of doesn't make
13:21:34 2 sense to do it.
13:21:38 3 I've dealt with a lot of -- in my MEMS work,
13:21:41 4 a lot of electrostatic examples of mechanical
13:21:46 5 devices and, you know, my interpretation of the
13:21:50 6 spring on both sides was because if you don't have
13:21:53 7 that, you face the danger of the weight hitting the
13:22:01 8 electrode and shorting it out.
13:22:08 9 Q In your opinion, does parallel vibration
13:22:11 10 versus perpendicular vibration make a difference?
13:22:16 11 A Parallel in what -- parallel to what?
13:22:19 12 Q Well, in your opinion, is Fukumoto parallel
13:22:23 13 or perpendicular vibration?
13:22:26 14 A Parallel or perpendicular to what? To the
13:22:29 15 screen?
13:22:30 16 Q Well, let's start with that.
13:22:32 17 A So in Fukumoto's primary embodiment, the
13:22:40 18 direction of motion is perpendicular to the screen.
13:22:44 19 Q Okay. Using that definition, Erixon and
13:22:53 20 Fuller are -- the vibration is parallel to the
13:22:56 21 screen?
13:22:58 22 A Well, in my interpretation of the aspect
13:23:03 23 ratios and, you know, that the aspect ratio of the
13:23:11 24 so-called tube being longer and the direction of
13:23:14 25 motion, that like you say, unless you made the PDA,

13:23:20 1 or whichever device it is, much thicker to
13:23:23 2 incorporate that longer tube, you would lay the tube
13:23:28 3 sideways. And so to feel a vibration on the screen,
13:23:35 4 you'd be relying upon the motor to convey its
13:23:43 5 vibration to the sides of the housing.
13:23:50 6 Q Okay. So in the context of -- I think what
13:24:01 7 you're saying is that Erixon and Fuller vibrate in a
13:24:09 8 parallel orientation to the screen of a PDA. Is
13:24:13 9 that your testimony?
13:24:13 10 A That was my interpretation if you were to
13:24:21 11 modify Fukumoto with either Erixon or Fuller.
13:24:26 12 Q Okay. So but regardless of whether the
13:24:32 13 actuator is vibrating perpendicular to the screen or
13:24:36 14 parallel to the screen, it's still making a
13:24:39 15 vibration sensation, isn't that right?
13:24:43 16 A Well, I think it's naturally -- you can
13:24:52 17 naturally conclude that if the vibration is parallel
13:24:56 18 to the screen, you won't feel it as much when you
13:25:00 19 touch the screen. Right.
13:25:11 20 Q So in your opinion, if a PDA or a phone that
13:25:17 21 used a parallel vibrator in Erixon or Fuller, it
13:25:25 22 could not provide haptic feedback to the screen?
13:25:29 23 A No, I'm not saying that. I'm saying that
13:25:33 24 inventive steps would be required to cause that
13:25:37 25 vibration to convey to the screen.

13:25:47 1 Q Can parallel and perpendicular vibrations
13:25:57 2 create different vibration modes?
13:25:59 3 A Again, I mean, these are inventive steps
13:26:05 4 that could be performed. And I'm not sure what
13:26:13 5 question you're asking, different modes, I mean
13:26:16 6 different frequencies, things like that? Is that
13:26:20 7 what you're saying.
13:26:21 8 Q Well, different sensations? How about that?
13:26:24 9 A I'm not sure I can make that conclusion
13:26:29 10 without further design.
13:26:33 11 Q Are linear vibration modules like that in
13:26:38 12 Erixon incapable of delivering vibration to the
13:26:41 13 screen?
13:26:44 14 A I'm just saying that if the vibrator, right,
13:26:54 15 is laid parallel to the screen inside the unit, that
13:27:04 16 it seems evident that there's more vibration
13:27:10 17 occurring at the -- in the direction of vibration,
13:27:16 18 not perpendicular to the direction of vibration.
13:27:19 19 And so if you were relying upon getting a vibrating
13:27:26 20 effect from the sides of the tube, that more
13:27:35 21 inventive steps would be required than are shown in
13:27:40 22 Erixon or Fuller or Fukumoto.
13:27:44 23 Q Can you pull out your declaration again?
13:28:22 24 A Yes.
13:28:23 25 Q Could you go to paragraph 138?

13:28:36 1 A Yes.
13:28:37 2 Q In your declaration at paragraph 138, you
13:28:53 3 state that paramagnetic materials are materials,
13:28:59 4 generally elements, that have an unpaired electron
13:29:03 5 in the outer atomic electron shell, right?
13:29:08 6 A Yes.
13:29:08 7 Q And you go on to say these materials will
13:29:10 8 become magnetized in the presence of a magnetic
13:29:15 9 field due to an alignment of electron spins. Right?
13:29:19 10 A Yes.
13:29:19 11 Q And these statements in your declaration,
13:29:25 12 they would have been well-known to POSITAs by 2009,
13:29:29 13 correct?
13:29:31 14 A I believe so.
13:29:33 15 Q And then in paragraph 138, you also opine
13:29:39 16 that paramagnetic materials can be very useful in
13:29:44 17 magnetic circuits since they can affect the magnetic
13:29:47 18 fields but do not become magnetized, correct?
13:29:50 19 A That was somewhat of a colloquial sentence
13:29:54 20 on my part. I probably should have qualified that
13:30:05 21 sentence, but I think they can be useful.
13:30:09 22 Q Okay. One of the ways paramagnetic
13:30:14 23 materials can affect magnetic fields is by reducing
13:30:19 24 magnetic reluctance, correct?
13:30:21 25 A Yes.

13:30:22 1 Q And that also would have been well-known by
13:30:25 2 2009, right, to POSITAs, I should say?
13:30:29 3 A You know, honestly, of course I've studied
13:30:34 4 magnetic circuits a lot and I can't recall an
13:30:39 5 instance where I've seen any textbook or paper
13:30:48 6 before this patent, before the Elenga patents, that
13:30:52 7 showed the use of paramagnetic materials to reduce
13:30:55 8 reluctance. I haven't done a study, but I can't say
13:31:03 9 that it would be -- it would have been obvious to a
13:31:05 10 POSITA at the time.
13:31:06 11 Q Can you pull out Ogusu which -- let me get
13:31:15 12 you the exhibit number. I do not know that one off
13:31:19 13 the top of my head. Exhibit 1015.
13:31:19 14 (Document marked previously as
13:31:27 15 Exhibit 1015 was presented.)
13:31:27 16 A Yes.
13:31:28 17 Q Turn to paragraph 47.
13:31:36 18 A Which one?
13:31:37 19 Q 47.
13:31:38 20 A 47. Yes.
13:31:42 21 Q In paragraph 47, and I think paragraph 54 it
13:31:48 22 says something similar, Ogusu discloses a yoke that
13:31:54 23 forms a "magnetic loop having the shortest path."
13:32:00 24 Do you see that?
13:32:01 25 A Yes. In his design, the magnetic field goes

13:32:08 1 through the yoke, I believe.
13:32:09 2 Q Do you agree with me that a POSITA reading
13:32:15 3 that would have understood that Ogusu's yoke would
13:32:19 4 reduce magnetic reluctance?
13:32:23 5 A Well, it could. I guess I would think a
13:32:31 6 POSITA would have to study the design. It doesn't
13:32:35 7 state that. It just states it has lower losses.
13:32:48 8 Q Is one of the impacts of reducing magnetic
13:32:52 9 reluctance that you would get lower losses?
13:32:58 10 A Well, you would -- you would require a lower
13:33:01 11 EMF force. So it's not -- it's not loss so much
13:33:08 12 that's involved in reluctance, but it's just how
13:33:12 13 much magnetic flux you can produce at a given EMF.
13:33:19 14 So they're not quite the same thing.
13:33:23 15 Q Going back to paragraph 138 of your
13:33:28 16 declaration, when you talk about how paramagnetic
13:33:31 17 materials can be very useful in magnetic circuits --
13:33:34 18 A Yeah, and again, that was, you know -- that
13:33:39 19 was perhaps too colloquial on my part.
13:33:41 20 Q Okay. But if not for magnetic reluctance,
13:33:50 21 why would paramagnetic materials have been very
13:33:58 22 useful in magnetic circuits?
13:34:00 23 A Good question. You know, it's only in as
13:34:10 24 much that they -- in some state of a magnetic
13:34:15 25 circuit, they can provide a path for the magnetic

13:34:17 1 field. And then in another state, they would not
13:34:22 2 retain magnetism. I can see where that could be
13:34:28 3 useful. But that's -- I can't qualify that
13:34:34 4 sentence. I was just, you know, somewhat struck by
13:34:36 5 the concept shown in Elenga.
13:34:43 6 Q Would you agree with me that reducing
13:34:45 7 magnetic reluctance has benefits?
13:34:47 8 A It can. It doesn't always necessarily.
13:34:57 9 Q I want to go back to Fukumoto, Exhibit 1005.
13:36:23 10 A Yes.
13:36:24 11 Q And also in your declaration.
13:36:26 12 A Okay. Which do you want me to refer to?
13:36:31 13 Q In your declaration if you could refer to
13:36:33 14 paragraph 92. And actually before we get to that I
13:36:49 15 have one more question about Ogusu.
13:36:54 16 As you might recall, Ogusu has that
13:36:59 17 ferromagnetic powder?
13:37:00 18 A Yes.
13:37:01 19 Q Right?
13:37:03 20 A I think you're referring to Dong, aren't
13:37:06 21 you?
13:37:07 22 Q Yeah. Sorry. Yes, actually I think you're
13:37:12 23 right, Dong. No, no, it is Ogusu. Dong has the
13:37:19 24 tungsten material. If you look at Ogusu at
13:37:21 25 paragraph 58.

13:37:24 1 A I thought you said ferromagnetic powder.
13:37:29 2 Oh, it does have powder. I'm sorry. Go ahead.
13:37:32 3 Q Yeah. So the ferromagnetic powders
13:37:39 4 described in Ogusu, would they reduce reluctance?
13:37:46 5 A Well, a ferromagnet reduces reluctance, yes.
13:37:52 6 So I imagine a ferromagnetic powder would as well.
13:37:56 7 Q All right. Let's go back to your
13:37:59 8 declaration at paragraph 92.
13:38:10 9 A Yes.
13:38:15 10 Q In paragraph 92, you opine that there would
13:38:18 11 be no motivation to modify Fukumoto's Figure 3
13:38:21 12 embodiment based on its Figure 83 embodiment,
13:38:24 13 correct?
13:38:24 14 A Well, Figure 3 is the magnetic embodiment
13:38:32 15 and Figure 83 is the electrostatic.
13:38:37 16 Q Okay. That's all very interesting, but I'm
13:38:44 17 just asking you what you said.
13:38:48 18 Did you opine in paragraph 92 of your
13:38:51 19 declaration that there would be no motivation to
13:38:53 20 modify Fukumoto's Figure 3 embodiment based upon its
13:38:56 21 Figure 83 embodiment? That's what you said, right?
13:39:01 22 A What I said was that no motivation was shown
13:39:05 23 to me.
13:39:09 24 Q Let's take a look at Fukumoto. If you go to
13:39:21 25 column 13.

13:39:44 1 A Column 13?
13:39:45 2 Q Yes.
13:39:46 3 A Okay.
13:39:47 4 Q And around line 39, there's a reference to a
13:39:59 5 first embodiment. Do you see that?
13:40:00 6 A Yes.
13:40:01 7 Q And then if you see -- look over in
13:40:12 8 column 14 beginning at around line 27.
13:40:19 9 A Yes.
13:40:19 10 Q Fukumoto describes its Figure 3 embodiment
13:40:26 11 as being part of what it refers to as its first
13:40:29 12 embodiment, correct?
13:40:34 13 A Apparently, yes.
13:40:37 14 Q Now, if you can go now to column 48.
13:40:50 15 A Yes.
13:40:50 16 Q Around line 53, there's a heading
13:40:54 17 "Modification 5." Do you see that?
13:40:56 18 A Yes.
13:40:57 19 Q Immediately below that it refers to
13:41:10 20 embodiments first through twelve. Do you see that?
13:41:15 21 A Yes.
13:41:16 22 Q And Fukumoto discloses that Figure 83 is a
13:41:20 23 second example of this fifth modification, isn't
13:41:23 24 that right?
13:41:25 25 A He refers to Figure 83 -- I'm getting 82 and

13:41:35 1 83 mixed up perhaps -- as the electrostatic
13:41:42 2 versions.
13:41:42 3 Q Figures 82 and 83 are part of modification 5
13:41:49 4 of the first through twelve embodiments, correct?
13:41:53 5 A Right. But within that modification, there
13:42:02 6 are specifically the electrostatic types as starting
13:42:05 7 to be discussed in column 49, line 10.
13:42:14 8 Q I understand. I think my question's a
13:42:17 9 little simpler than that. All that's described in
13:42:21 10 -- regarding -- all I'm trying to understand is make
13:42:25 11 sure that I'm not wrong when I see in Fukumoto that
13:42:32 12 modification 5 can apply to the first embodiment
13:42:38 13 which is shown in Figure 3?
13:42:44 14 A Well, I mean, what is modification 5?
13:42:50 15 Q Well, I think that you said earlier -- you
13:42:52 16 agreed with me that it included both Figure 82 and
13:42:56 17 Figure 83?
13:42:57 18 A No. Figure 82 and 83 are definitely
13:43:01 19 electrostatic versions.
13:43:02 20 Q And they're referred to in the patent as
13:43:05 21 modification 5, correct?
13:43:07 22 A Well, they're included in that discussion.
13:43:10 23 Q So you just think that Fuller -- that
13:43:13 24 Fukumoto is just wrong? What he said is not what he
13:43:16 25 said? I don't understand what you're saying.

13:43:19 1 A I'm just saying that -- I mean, I'm looking
13:43:25 2 at modification 5 and when Figure 82 and 83 come up,
13:43:35 3 it is specifically with regard to the electrostatic
13:43:38 4 versions.
13:43:39 5 Q I understand. Modification 5 modifies the
13:43:44 6 first through twelfth embodiment by using
13:43:47 7 electrostatic technology, correct?
13:43:52 8 A Well, I mean, it's sort of weird because I
13:43:57 9 mean, he talks about magnets in the second
13:44:02 10 paragraph of modification 5. And so I'm not sure
13:44:06 11 how they play a role in an electrostatic version.
13:44:11 12 It's sort of odd. It's almost like the paragraph is
13:44:14 13 out of place.
13:44:15 14 Q Okay. Well, a person reading this would see
13:44:20 15 that at least Fukumoto thought that he could modify
13:44:24 16 the first embodiment with the teachings of the fifth
13:44:29 17 modification, correct?
13:44:30 18 A Well, and the question in my mind as a
13:44:34 19 POSITA is what is modification 5. If modification 5
13:44:38 20 is electrostatics rather than electromagnetics,
13:44:44 21 well, then it kind of makes sense except for the
13:44:48 22 second paragraph under modification 5 is out of
13:44:50 23 place.
13:44:59 24 Q Putting aside the second paragraph --
13:45:03 25 A If you put aside the second paragraph, my

13:45:06 1 interpretation is modification 5 is the use of
13:45:09 2 electrostatics rather than magnetic fields.
13:45:12 3 Q Okay. Would a POSITA reading Fukumoto
13:45:23 4 understand that the Figure 3 embodiment could be
13:45:28 5 modified with the Figure 83 embodiment?
13:45:30 6 A I don't see how because one's magnetic
13:45:33 7 fields with coils and the other, you know -- and
13:45:37 8 magnets and the other's electrostatic.
13:45:40 9 Q Is it your opinion that a POSITA would
13:46:02 10 consider electrostatic technology and magnetics
13:46:06 11 technology to be completely different from each
13:46:08 12 other?
13:46:08 13 A Yes.
13:46:09 14 Q And is it your opinion that a POSITA
13:46:16 15 designing a magnetic device would never look to
13:46:20 16 teachings from the electrostatic technology field?
13:46:24 17 A I mean, look for what? I mean, it's a
13:46:30 18 completely different way of causing motion to occur.
13:46:34 19 One uses magnetic fields and the other uses electric
13:46:37 20 fields. And there's all kinds of different design
13:46:43 21 structures and rules and problems that can occur.
13:46:49 22 So you couldn't take a design in electrostatics and
13:46:56 23 simply turn it into a design for electromagnetics, I
13:47:01 24 don't think.
13:47:01 25 Q Generally speaking, when forming your expert

13:47:14 1 opinions, is it your practice to disregard
13:47:18 2 combinations proposed or discussed by a particular
13:47:21 3 patent?
13:47:22 4 A A combination discussed by the patent
13:47:25 5 itself?
13:47:25 6 Q Yeah, for example, Fukumoto?
13:47:29 7 A Not necessarily, but I would want to
13:47:37 8 evaluate whether I thought the combination made any
13:47:39 9 sense. Which combination are you referring to,
13:47:44 10 which language here?
13:47:45 11 Q How do you determine when to give the
13:47:47 12 express language of a patent weight?
13:47:50 13 A Well, we're diverting off into, you know --
13:47:59 14 like you're asking me do I think the inventor has
13:48:02 15 got it wrong somewhere. I mean, where are you
13:48:05 16 pointing to here in Fukumoto?
13:48:07 17 Q I'm asking you generally speaking. I'm not
13:48:10 18 referring specifically to Fukumoto right now.
13:48:11 19 A In my experience, do I ever think that an
13:48:14 20 inventor has gotten it wrong? Like I can't think of
13:48:16 21 an instance right now, no. If I saw a passage in a
13:48:32 22 patent where an inventor proposed a design, I would
13:48:38 23 -- I would want to understand it before discounting
13:48:42 24 it.
13:48:50 25 MR. MILLER: Let me go off the record.

13:48:58 1 (Short recess.)
13:55:35 2 BY MR. MILLER:
14:03:20 3 Q Dr. Goossen, can you pull out Fukumoto
14:03:24 4 again?
14:03:30 5 A Yes.
14:03:30 6 Q And I want to go to column 48 again.
14:03:37 7 A Yes.
14:03:38 8 Q Starting at around line 54.
14:03:42 9 A Yes.
14:03:43 10 Q Fukumoto states the following, "In the first
14:03:47 11 to twelfth embodiments, the vibrator generator is
14:03:51 12 not limited to a linear oscillatory actuator or a
14:03:55 13 vibrator having an eccentric weight. For example,
14:04:00 14 it is also possible to use a vibration generator
14:04:02 15 using a piezoelectric element."
14:04:05 16 Do you see that?
14:04:05 17 A Yes.
14:04:06 18 Q Do you agree or disagree with that
14:04:09 19 statement?
14:04:10 20 A I know for a fact that you can cause
14:04:17 21 vibrations with a piezoelectric element. It's just
14:04:24 22 that the statement seems disconnected from what
14:04:27 23 follows.
14:04:28 24 Q So is it fair to say then that you disagree
14:04:32 25 with that statement in the context of a Fukumoto

14:04:36 1 reference?
14:04:36 2 A Well, I mean, I guess I'm saying that I
14:04:44 3 agree at least with the second sentence. It is
14:04:49 4 possible to have a vibration generator using a
14:04:56 5 piezoelectric element. It's just I'm not sure how
14:05:00 6 piezoelectrics are introduced in the earlier
14:05:03 7 embodiments. He doesn't appear to explain it.
14:05:11 8 Q Okay. Let me shift gears for a second. You
14:05:18 9 -- let me start again.
14:05:19 10 You testified a little earlier today that
14:05:22 11 you didn't do anything to determine the length of
14:05:26 12 the motor in Erixon. Do you remember that?
14:05:30 13 A I don't think it's stated, no.
14:05:32 14 Q And you didn't do anything to try to figure
14:05:34 15 out what that length was, did you?
14:05:36 16 A I did not.
14:05:37 17 Q Okay. Did you do anything to determine the
14:05:40 18 length of the motor in Fuller?
14:05:41 19 A I did not.
14:05:44 20 MR. MILLER: I'll pass the witness.
14:05:45 21 MR. RUBIN: No questions from me.
22
23 (Time Noted: 2:06 p.m.)
24
25

1 C E R T I F I C A T E
2
3 I, Sandra L. Rocca, CSR, RMR, RDR, CRR, a
4 Certified Court Reporter within and for the States
5 of Illinois, Florida, Washington and Georgia, do
6 hereby certify:
7 That KEITH W. GOOSSEN, Ph.D., the witness
8 whose deposition is hereinbefore set forth, was duly
9 sworn by me and that such deposition is a true
10 record of the testimony given by such witness.
11 I further certify that I am not related to
12 any of the parties to this action by blood or
13 marriage; and that I am in no way interested in the
14 outcome of this matter.
15 IN WITNESS WHEREOF, I have hereunto set my
16 hand this 7th of July, 2024.
17
18
19 _____
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