

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

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SAMSUNG ELECTRONICS CO., LTD., and)	Paper No. 23
	)Case No. IPR2023-00992
SAMSUNG ELECTRONICS AMERICA, INC.,)	U.S. Patent No.
	)9,369,081
Petitioners,)	and
	)Paper No. 25
v.)	Case No. IPR2023-00993
	)U.S. Patent No.
RESONANT SYSTEMS, INC.,)	9,941,830
Patent Owner.)	

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REMOTE DEPOSITION OF ANDREW WOLFE, PH.D.

THURSDAY, MARCH 28, 2024

9:00 A.M. PDT

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Reported by:

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)Paper No. 25
7 v.)Case No. IPR2023-00993
)U.S. Patent No.
8 RESONANT SYSTEMS, INC.,)9,941,830
)
9 Patent Owner.)

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REMOTE DEPOSITION OF ANDREW WOLFE, PH.D., located
in Santa Clara, California, commencing at 9:03 A.M. PDT on
Thursday, March 28, 2024, before JULIE RUMSEY, Certified
Shorthand Reporter 14144, in and for the State of
California.

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1 THURSDAY, MARCH 28, 2024, 9:03 A.M. PDT

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3 CERTIFIED STENOGRAPHER: Good morning. My name is

4 Julie Rumsey, California Certified Shorthand Reporter

5 Number 14144. The stenographic record is the official

6 record pursuant to C.C.P. 2025.

7 ---o0o---

8 ANDREW WOLFE, PH.D.,

9 called as a witness herein, having been

10 administered an oath remotely in accordance with C.C.P.

11 Section 2096, was examined and testified as follows:

12 ---o0o---

13 EXAMINATION

14 BY ATTORNEY RUBIN:

15 Q. Good morning, Dr. Wolfe.

16 A. Good morning.

17 Q. And am I right that you're located in California,

18 so it is, in fact, still morning for you?

19 A. Yes. I'm in Santa Clara.

20 Q. Very good.

21 Have you been deposed before?

22 A. Yes.

23 Q. How many times?

24 A. I don't know, but more than 100.

25 Q. Okay. Were all of those depositions in -- in the

1 capacity as an expert witness?

2 A. Not all of them. No.

3 Q. How many were in some capacity other than as an
4 expert witness?

5 A. How many were other than -- I don't have an exact
6 count, but probably somewhere around five.

7 Q. What case or cases were those five nonexpert
8 depositions in?

9 A. I don't have the actual case captions or case
10 names. I was an officer of a public company for a number
11 of years. I was the corporate representative in certain
12 matters, and I was a director of a company for -- I still
13 am -- for over a dozen years. And I was deposed in my role
14 as a director of that company.

15 Q. Okay. So all of those nonexpert depositions were
16 in connection with your role in one specific company or was
17 there more than one?

18 A. No. It was more than one company.

19 Q. Okay. What companies were those?

20 A. Some of them were a company called S3, what was
21 later called SONICblue, and some of them were with a
22 company called Turtle Beach.

23 Q. Were those -- were any of those patent cases where
24 you were deposed as a corporate officer or director or
25 representative?

1 A. To the best of my recollection, no.

2 Q. So for the cases where you've been deposed as an
3 expert witness, were those -- what fraction of those were
4 patent cases?

5 (Clarification by the certified stenographer.)

6 BY ATTORNEY RUBIN:

7 Q. Sorry. Let me withdraw.

8 For the cases where you were deposed as an expert
9 witness, what fraction of those were patent cases to the
10 best you're able to estimate?

11 A. Again, I don't have a count, but probably
12 ballpark, 90 percent.

13 Q. Well, you should be pretty familiar with the
14 deposition process, I suppose, at this point, but I'll just
15 go over a couple of ground rules.

16 You understand today that you're under oath just
17 as if you were testifying in a court of law?

18 A. I understand that.

19 Q. And, particularly, since today our only record of
20 this deposition is a stenographic record from our court
21 reporter, it is quite important that she actually can
22 understand everything that we say. So it's important that
23 we make sure not to talk over each other.

24 So please wait to make sure that I'm done asking
25 the question before you answer, and I'll try the best that

1 I can not to talk over your answers.

2 Is that okay?

3 A. I understand.

4 Q. At any point you don't hear or understand a
5 question, please let me know, and we'll try to make sure
6 that you do, in fact, understand what I am asking.

7 Is that fair?

8 A. Yes.

9 Q. And so if you do answer a question, would you
10 agree that it's reasonable for us to all assume that, in
11 fact, you did understand what you were answering?

12 A. At least I thought I understood what I was asked.

13 Q. Okay. We'll take breaks for a few minutes at the
14 end of every hour, hour and a half of testimony. If you do
15 need to take a break at some other time, please feel free
16 to ask, but I will insist that any pending question be
17 answered before we actually take the break.

18 Is that fair?

19 A. Okay.

20 Q. Is there any reason you cannot give complete and
21 accurate testimony here today?

22 A. Not that I know of.

23 Q. Are you sick today?

24 A. No.

25 Q. Are you on any medications that would affect your

1 ability to understand and answer questions?

2 A. No.

3 Q. And at some point today, counsel for Samsung may
4 object to some of my questions, but you still have to
5 answer the question in spite of the objection unless you're
6 specifically instructed not to answer.

7 Do you understand?

8 A. I understand.

9 Q. All right. Can't imagine that any of that was
10 news to you. All right.

11 So you understand that we are here today for a
12 deposition concerning two IPR petitions that were submitted
13 by Samsung Electronics and Samsung Electronics America
14 challenging two patents of Resonant Systems?

15 You understand that?

16 A. Yes. Specifically IPR 2023-0992 and 0993.

17 Q. That's right.

18 And you submitted a declaration in support of each
19 of those petitions, in the two IPR proceedings you just
20 listed; is that right?

21 A. I have.

22 Q. And do you have copies of your declarations with
23 you here today?

24 A. I do. Not every exhibit, but I do have the
25 declarations themselves.

1 Q. All right. Can you tell me -- so you have the two
2 declarations. Do you have other exhibits beyond just those
3 two declarations?

4 A. I do. I have the two challenge patents and
5 certain pieces of prior art.

6 Q. All right. Can you tell me which pieces of prior
7 art you have with you.

8 A. Yes. Again, I don't have the exhibit numbers on
9 my copies. But the Fukumoto reference, the Ueda reference,
10 the Barton reference, the Grant reference, and the Ogusu
11 reference.

12 The other ones are on my computer somewhere, but
13 I'm not looking at them right now.

14 Q. All right. So probably the -- well, I guess for
15 the court reporter's benefit, Fukumoto is spelled
16 F-u-k-u-m-o-t-o; is that right?

17 A. Yes.

18 Q. And you mentioned Ueda, that's U-e-d-a, correct?

19 A. Yes.

20 Q. You mentioned a computer of yours. Do you have
21 that computer in front of you or any computer --

22 (Clarification by the certified stenographer.)

23 THE WITNESS: The documents are on the computer --

24 BY ATTORNEY RUBIN:

25 Q. Withdrawn. Withdrawn. Sorry.

1 So I take it that since this deposition is being
2 conducted over Zoom, you have a computer in front of you
3 that you're using for the Zoom conference; is that right?

4 A. Yes.

5 Q. And is that the computer that you referred to
6 where you have copies of other exhibits?

7 A. Yes.

8 Q. All right. Are there -- aside from exhibits that
9 have been filed in this case, are there any other materials
10 that you have on that computer that you would intend to
11 refer to during this deposition?

12 A. I don't intend to refer to anything on the
13 computer unless we agree to it.

14 Q. Okay. Beyond the declarations and the prior art
15 exhibits that you mentioned, do you have any other notes
16 with you or any other materials that you would be
17 consulting during the deposition today?

18 A. No. Again, with the exception of any documents
19 that -- that we agree to reference.

20 Q. So I'm uploading some exhibits in these IPRs as
21 PDFs in the Zoom chat function. They should be
22 identical to -- they are what was filed, and they should be
23 identical to what you have in front of you with the
24 exception perhaps of your copies not having exhibit numbers
25 on them.

1 You can feel free to look at the PDFs that I'm
2 sharing in answering your questions or paper copies.
3 Whatever is most convenient for you.

4 A. Okay.

5 Q. And then I will also be sharing some documents on
6 the screen.

7 So I've uploaded two documents that are each
8 marked as Exhibit 1003. One of them is titled Declaration
9 of Andrew Wolfe, Ph.D., in support of --

10 (Clarification by the certified stenographer.)

11 BY ATTORNEY RUBIN:

12 Q. -- The United States -- I'm sorry. I'll -- I'll
13 start over.

14 And I can share it on the screen if that's helpful
15 for you.

16 Okay. So the first document that I've uploaded is
17 Exhibit 1003 and the IPR2023-00992. There is a title
18 beginning Declaration of Andrew Wolfe, Ph.D.

19 Do you see that?

20 A. Yes.

21 (Exhibit 1003, marked previously, was presented.)

22 BY ATTORNEY RUBIN:

23 And then the second exhibit that I've uploaded,
24 which I'm not sharing on the screen, is Exhibit Number
25 1003, IPR2023-00993, also bears the title beginning

1 Declaration of Andrew Wolfe, Ph.D.

2 Do you see that?

3 A. I do.

4 (Exhibit 1003, marked previously, was presented.)

5 BY ATTORNEY RUBIN:

6 Q. So these, you would agree, are the declarations
7 that you submitted in these two IPRs?

8 A. They appear to be.

9 Q. So I may sometimes refer to the two IPRs we're
10 talking about here today as the '992 IPR and the '993 IPR
11 or perhaps sometimes as the '081 Patent IPR and the '830
12 Patent IPR.

13 You'll understand what I'm referring to when I use
14 that terminology?

15 A. I will.

16 Q. So each of these declarations is somewhat lengthy.
17 The '992 IPR declaration is 215 pages in PDF form, the '993
18 declaration is 216 pages in PDF form.

19 Would you agree that the invalidity grounds that
20 you present in these two declarations are the same?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: They're based on the same art
23 because the claims slightly differ. The explanations
24 slightly differ as well.

25 BY ATTORNEY RUBIN:

1 Q. So looking at the table of contents for the '992
2 declaration, you go through a series of grounds of 1A, 1B,
3 1C, and so on through 1U, and then 2A through 2I.

4 You see that as I flip through the table of
5 contents?

6 A. I do.

7 Q. And so in the '993 declaration, you similarly
8 present Ground 1A through 1U, and the Ground 2A through 2I.

9 Do you see that?

10 A. I do.

11 Q. So the -- the number of grounds that you identify
12 with a number and letter are the same in each of the two
13 declarations.

14 Would you agree?

15 A. There is the same number of grounds in each of the
16 two declaration, yes.

17 Q. And for each ground in the '992 declaration, there
18 is a corresponding ground in the '993 declaration that
19 involves the same combination of prior art references.

20 Would you agree to that?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: As best as I can recall, the same
23 art is used in corresponding grounds across the two
24 applications -- or the two declarations.

25 BY ATTORNEY RUBIN:

1 Q. And would you agree that if you go through the
2 '992 declaration paragraph by paragraph, for most of the
3 paragraphs, you can find a corresponding paragraph in
4 the 993 declaration that has the same or very similar text?

5 ATTORNEY MARANDO: Objection. Form.

6 THE WITNESS: Where the claims are similar or
7 identical, there is similar text across the two
8 declarations. And where there are different claims or
9 different language that's meaningful, there are some
10 differences.

11 BY ATTORNEY RUBIN:

12 Q. So in your opinions on how certain --
13 (Clarification by the certified stenographer.)

14 BY ATTORNEY RUBIN:

15 Q. -- prior art references could be combined, do you
16 recall there being any differences between how
17 references -- how you propose that references would be
18 combined for a ground in the '992 declaration from how the
19 references would be combined for the corresponding ground
20 in the '993 declaration?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: I don't recall any differences in
23 the motivations to combine references or the specific way
24 the references would be combined, but the declarations
25 speak for themselves.

1 BY ATTORNEY RUBIN:

2 Q. So turning to paragraph 30 of the '992
3 declaration, you have a description of the relevant field
4 of art.

5 Do you see that?

6 A. On paragraph 30 I quote the relevant field of art
7 from the '081 Patent.

8 Q. All right. And then in the '993 declaration, you
9 have a -- you also have a paragraph 30 where you quote the
10 same description of relevant field of art from the '830
11 Patent.

12 Would you agree?

13 A. I do.

14 Q. And in the text that you quote from each of the
15 patents, the patent says, quote, the current application is
16 directed to various types of linear vibrational models --
17 I'm sorry -- linear vibrational modules.

18 Do you see that?

19 A. I see that.

20 Q. Now, you have a description of your background and
21 experience in each of these declarations. Would you agree
22 that you don't describe having any experience in designing
23 or building linear vibrational modules?

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: Designing or building them, I think

1 that's correct. They're an ordinary component. You can
2 purchase them. You can read data sheets. They're in
3 textbooks. I teach about them. But I have not designed
4 one. I haven't designed a transistor either. There's lots
5 of components that I use as an electrical engineer that I
6 haven't designed.

7 BY ATTORNEY RUBIN:

8 Q. Do you agree that -- well, withdrawn.

9 You just referred to teaching about linear
10 vibrational models -- modules -- withdrawn.

11 You just referred to teaching about linear
12 vibrational modules. Would you agree that your
13 declarations do not describe having done any teaching about
14 linear vibrational modules?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: That appears to be correct. I don't
17 specifically address my teaching details in this particular
18 declaration.

19 BY ATTORNEY RUBIN:

20 Q. When would be the last time that you taught
21 students about linear vibrational modules?

22 A. Last month.

23 Q. What class is that?

24 A. My mechatronics class where I teach about all
25 kinds of electromagnetic actuators.

1 Q. Where do you teach that class?

2 A. At Santa Clara University.

3 Oh. I'm sorry. It is in there. It's in

4 paragraph 9 where I say I teach about all kinds of

5 electromagnetic actuators.

6 Q. So I'd like to ask you about -- in text, it's a

7 little bit different between the two declarations.

8 Specifically, in paragraph 61 in each declaration.

9 We're looking on the screen at the declaration

10 from the '992 IPR. And here you say that it's your opinion

11 that claims, quote, are anticipated and/or rendered obvious

12 by the prior art.

13 Do you see that?

14 A. Yes.

15 Q. Now, turning to the '993 declaration, paragraph

16 61, you say that claims, quote, are rendered obvious by the

17 prior art.

18 Do you see that?

19 A. Yes.

20 Q. So the '993 declaration, you don't mention

21 anticipation in this paragraph.

22 Would you agree?

23 A. That's correct. I don't remember discussing it a

24 whole lot in the '081 declaration either. But mostly the

25 declaration is focused on obviousness.

1 Q. Yeah. Would you agree that each of the grounds
2 listed in the table of contents in the '992 declaration
3 refers to prior art that, quote, renders obvious certain
4 claims?

5 A. That's my recollection.

6 Q. And so, at least in the table of contents, you
7 never mention any grounds where you refer to the claim
8 being anticipated by prior art; would you agree?

9 A. I think that's correct.

10 Q. Would you agree that you don't actually have
11 opinions in this declaration, the '992 IPR declaration,
12 showing that any claim is anticipated by a specific prior
13 art reference?

14 ATTORNEY MARANDO: Objection. Form.

15 THE WITNESS: I don't recall. Again, the
16 declaration speaks for itself. I remember being focused on
17 obviousness, but there may be an exception.

18 BY ATTORNEY RUBIN:

19 Q. So I'd like to turn to paragraph 130 in your '992
20 declaration, which is part of your section on claim
21 construction.

22 Do you see that?

23 A. Yes. Let me take a look at the context here.

24 Yes.

25 Q. And paragraph 130 in the '992 declaration begins,

1 quote, for this issue, I understand multiple possible
2 interpretations exist.

3 (Clarification by the certified stenographer.)

4 BY ATTORNEY RUBIN:

5 Q. -- I understand multiple possible interpretations
6 exist.

7 My apologies.

8 Do you see that?

9 A. Yes. Specifically 2.

10 Q. And in paragraph 126 of your '993 declaration, the
11 paragraph, likewise, begins, quote, for this issue, I
12 understand multiple possible interpretations exist.

13 Do you see that?

14 A. Right. There is a -- there are flaws in claim 4,
15 but I do believe that they can be resolved.

16 Q. Okay. So there is an issue that you see in
17 claim 4 of the '081 Patent, and there is essentially the
18 same issue in claim 4 of the '830 Patent.

19 Would you agree?

20 A. Yes. There is an issue, but as I noted here, it's
21 not an issue that needs to be -- it's not an issue for
22 purposes of my opinions in this IPR because I can consider
23 multiple different possible interpretations.

24 Q. And so this issue that you point to in claim 4 of
25 each of the two patents is that each claim says it depends

1 from claim 1 but then refers to the sensors or the one or
2 more operational control outputs, which seem to be
3 references to elements introduced in claim 3 of each
4 patent.

5 Would you agree that's the issue?

6 ATTORNEY MARANDO: Objection.

7 THE WITNESS: It could be. Right? So there's no
8 way for a reader to determine whether or not those elements
9 are being recited fresh or whether or not there is an error
10 in the dependency chain. So for purposes of the IPR, I can
11 consider it both ways.

12 Some point for somebody to be able to make an
13 infringement determination, either a court's going to have
14 to resolve that or it's going to have to be determined to
15 be -- to be unresolvable.

16 BY ATTORNEY RUBIN:

17 Q. So for claim 4, in each of the two patents, you
18 interpret the claim in two possible ways. One is that you
19 interpret it to really be dependent from claim 3, and to
20 have this -- have these references back to antecedent
21 elements in claim 3, and then the other way you interpret
22 it is essentially to -- interpret it as if the word "the"
23 didn't appear in certain places in claim 4; is that right?

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: Yeah. For purposes of the IPR, I

1 can't tell which one of those is the correct approach, so

2 I've analyzed it under both approaches.

3 BY ATTORNEY RUBIN:

4 Q. But under -- either one of those approaches,
5 whether it's to interpret the claim as actually dependent
6 from claim 3 or to interpret it as if the word "the" didn't
7 appear in certain places, under each of those alternatives,
8 you can understand and interpret the claim without any
9 difficulty or ambiguity; is that right?

10 ATTORNEY MARANDO: Objection. Form.

11 THE WITNESS: If I understand your question, I
12 can't determine which of those two approaches is -- is the
13 correct approach in understanding the claim, but once I'm
14 asked to assume that either one is correct, I can then
15 understand the claim and apply it.

16 BY ATTORNEY RUBIN:

17 Q. As somebody who's spent time studying these claims
18 and the patents that they appear in and tried to interpret
19 the claims, do you have any view as to which is the more
20 plausible interpretation of claim 4 in each patent?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: I think they're equally plausible.

23 BY ATTORNEY RUBIN:

24 Q. I'll ask you to turn to paragraph 171 in the '992
25 declaration where you describe -- withdrawn.

1 So if you could turn to paragraph 171 in your '992
2 declaration. This is part of your discussion of
3 obviousness in view of Fukumoto. And here in this
4 paragraph, you refer to another patent application to
5 Nagara.

6 Do you see that?

7 A. Yes.

8 Q. And you say that a person of skill in the art
9 would have recognized Nagara, quote, depicts how user
10 manipulates Fukumoto's screen-based interface.

11 Do you see that?

12 A. I do.

13 Q. Are you aware of there being any relationship
14 between the Nagara patent application and the Fukumoto
15 patent beyond the fact that they're both patents or patent
16 applications?

17 ATTORNEY MARANDO: Objection. Form.

18 THE WITNESS: Well, I mean, Nagara is intended to
19 simply be exemplary of what a touch-screen adjustment
20 control looks like. A person of ordinary skill by this
21 time, 2009, 2010, would have known, given Fukumoto's
22 explanation, that it uses a touch panel for its user
23 interface. They would have understood what that user
24 interface looks like.

25 This is decades after touch panels were

1 introduced. This is after the iPhone had become popular.
2 A person of ordinary skill would have understood what a
3 touch panel user interface that's disclosed in Fukumoto
4 looks like.

5 But I thought that in the declaration it would be
6 helpful to provide an illustration. And rather than
7 creating my own, I pointed to Nagara as an example of what
8 a -- an adjustment control on a touch-user interface would
9 look like.

10 BY ATTORNEY RUBIN:

11 Q. You're not aware of any evidence that any of the
12 inventors listed in Nagara are the same as any of the
13 inventors listed on Fukumoto; is that right?

14 ATTORNEY MARANDO: Objection. Form.

15 THE WITNESS: You okay with me looking at those
16 references again?

17 BY ATTORNEY RUBIN:

18 Q. Sure.

19 And, just to be clear, are you looking at Fukumoto
20 Exhibit 1005 and Nagara Exhibit 1034?

21 (Exhibit 1005, marked previously, was presented.)

22 THE WITNESS: My copies don't have the exhibit
23 numbers on them, but I'm -- I'll take your word that those
24 are the correct ones.

25 They have distinct inventors.

1 BY ATTORNEY RUBIN:

2 Q. And you're not aware of any evidence that the
3 inventors of these two patents or patent applications,
4 Fukumoto and Nagara, were working for the same company or
5 working on the same products when they developed their
6 inventions?

7 ATTORNEY MARANDO: Objection. Form.

8 THE WITNESS: I don't know one way or the other.

9 BY ATTORNEY RUBIN:

10 Q. Would you agree that Fukumoto does provide
11 descriptions, at least an example, of user interface that
12 contains buttons on the touch screen?

13 ATTORNEY MARANDO: Objection. Form.

14 THE WITNESS: Buttons are one of the things that
15 are disclosed. And, yes, anybody else that discloses other
16 normal touch screen things like dragging an icon in
17 figure 38 and 39, and slider control for adjusting the
18 quantity in figure 41.

19 And figure 41 is cited in paragraph 170 of the 992
20 declaration.

21 (Clarification by the certified stenographer.)

22 BY ATTORNEY RUBIN:

23 Q. So figure 41 of Fukumoto describes a slider that's
24 used by moving your finger up or down in a vertical
25 direction on the touch screen.

1 Would you agree?

2 A. I don't know that that's completely clear, but,
3 certainly, once one discloses an up-or-down slider, a
4 left-or-right slider would be obvious by this time period.

5 Q. Pardon me.

6 You would agree that the slider from Nagara that
7 you -- as shown in Nagara figure 2, which you include in
8 your declaration, is used by sliding the finger
9 horizontally from left to right?

10 A. In that particular embodiment, it is. Yes. As I
11 look again, I -- the illustration of figure 41, as it's
12 oriented, appears to be up and down, but there's nothing in
13 the description that would suggest that it's specifically
14 an up/down adjustment.

15 Q. So is it your opinion that Nagara shows a slider
16 interface that one skilled in the art could have used
17 instead of the slider interface that's shown in figure 41
18 of Fukumoto?

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: No. I think it's closer to what I
21 explained before, that a person of ordinary skill in the
22 art would have known how to incorporate a slider interface,
23 and Fukumoto suggests and teaches a slider interface.

24 So Nagara is illustrative of one type of slider
25 interface that would have been known to a person of

1 ordinary skill in the art.

2 BY ATTORNEY RUBIN:

3 Q. And is the slider interface in figure 41 of
4 Fukumoto another type of slider interface that would have
5 been known to a person of ordinary skill in the art?

6 A. Yes. At that point, the -- the kinds of details
7 that are illustrated in figure 41 and in figure 2 of Nagara
8 are simple design choices. What direction to make things,
9 what shape to make things. Those are very simple design
10 choices when designing an on-screen control for a touch
11 adjustment by the 2009 time frame.

12 Q. Would you agree that Fukumoto in its description
13 of slider 41 describes that slider being used to adjust an
14 amplitude of a vibration drive signal?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: That's exemplary. Actually, in
17 column 30 of Fukumoto, starting at around line 50, it
18 explains that it's for adjusting the value of a parameter
19 and then it gives some examples.

20 So I think a person of ordinary skill would
21 understand that any parameter could be adjusted using this
22 mechanism. And then Nagara illustrates that as well.

23 BY ATTORNEY RUBIN:

24 Q. Would you agree that Fukumoto does not mention
25 frequency being a parameter that would be changed using the

1 slider in figure 41?

2 ATTORNEY MARANDO: Objection. Form.

3 THE WITNESS: No. I think if you read the
4 entirety of Fukumoto, you would understand that the
5 frequency is a parameter of Fukumoto's system. So when
6 Fukumoto discloses an on-screen adjustment for parameters,
7 I think a person of ordinary skill would understand that
8 any functional parameter or any operational parameter of
9 the Fukumoto PDA could be adjusted using a similar scale or
10 knob as Fukumoto refers to it.

11 BY ATTORNEY RUBIN:

12 Q. But you would agree that there's no specific
13 description in Fukumoto of using the slider in figure 41 to
14 change the frequency, correct?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: Well, it specifically talks about
17 using it to determine the waveform data to be applied to
18 the oscillary actuator 115. And that, of course, would
19 include the amplitude and the frequency in the waveform
20 data.

21 In fact, it cites a special case in column 31 at
22 line 27 of changing only the amplitude. So I would assume
23 that that's not the ordinary case.

24 BY ATTORNEY RUBIN:

25 Q. Before -- just before you referred to this special

1 case, as you put it. Was there a specific portion of
2 Fukumoto that you were quoting from when you're talking
3 about --

4 A. Yeah. I mean, I was looking specifically at
5 column 30, line 61, through column 31, line 3, but, more
6 generally, the overall description from column 30, line 48,
7 through column 31, line 54.

8 Q. So turning the page --

9 A. That section also refers you to figure 78 which,
10 again, has a similar kind of a sliding control.

11 Q. Turning to paragraph 177 of your '992 declaration.
12 You refer to a patent application to Yoon, which you called
13 the -- which you call Yoon '554.

14 Do you see that?

15 A. Give me a second to read the paragraph.

16 Okay.

17 I'm sorry. Did I miss the question?

18 Q. No. I was just asking you to look at where you
19 refer to Yoon '554.

20 So are you aware of any connection between
21 Yoon '554 and the Fukumoto patent beyond the fact that
22 they're both patents or patent applications?

23 ATTORNEY MARANDO: Objection. Form.

24 THE WITNESS: Yoon's merely an illustration of how
25 a person of ordinary skill in the art would understand the

1 teachings of Fukumoto. Fukumoto explains that the
2 oscillation is driven by a stored waveform data table. A
3 person of ordinary skill would understand that.

4 Again, that's very common. That's, again,
5 something that I teach in my classes. It's ordinary, and
6 it's elementary.

7 But for purposes of illustrating it in the
8 declaration, I've pointed to Yoon, which illustrates more
9 of the details of how a person of ordinary skill in the art
10 would implement a waveform data table-driven oscillation,
11 and the fact that it would be used to adjust both the
12 frequency and the amplitude of the vibration.

13 BY ATTORNEY RUBIN:

14 Q. And so am I to understand that you point to Yoon
15 as a description of adjusting both amplitude and frequency
16 of vibration because Fukumoto does not explicitly describe
17 adjusting both amplitude and frequency of vibration?

18 ATTORNEY MARANDO: Objection. Form.

19 THE WITNESS: I wouldn't characterize it that way.
20 I believe that Fukumoto discloses it sufficiently for a
21 person of ordinary skill in the art, but I thought it would
22 be helpful for the board in the case that they might not be
23 a person of ordinary skill in the art to see an additional
24 example or illustration.

25 BY ATTORNEY RUBIN:

1 Q. Turn to page 97 of your '992 declaration. You
2 have a figure that shows four different types of waveforms,
3 which you label as sine, square, triangle, and sawtooth.

4 Do you see that?

5 A. Yes.

6 Q. Would a person skilled in the art understand all
7 four of those to be examples of alternating current
8 signals?

9 A. It would depend on context, but in many cases,
10 yes.

11 Q. Now, you refer to using an H-bridge to generate an
12 alternating current signal.

13 Would you agree?

14 A. An H-bridge can be one way to generate an
15 alternating current signal for certain kinds of loads.

16 Yes.

17 Q. So would a person skilled in the art use an
18 H-bridge to generate a sine wave?

19 A. To generate a sine wave --

20 ATTORNEY MARANDO: Objection. Form.

21 THE WITNESS: That is a somewhat complicated
22 question, and it depends very much on your semantics. I
23 teach students to use an H-bridge to simulate a sine wave.
24 Are they technically generating one? For their purposes,
25 they are, because it's close enough that it behaves as a

1 sine wave.

2 An H-bridge is used to -- or an H-switch, which is
3 the language of one of the patents, is used to alter the
4 direction of current going through typically a reactive
5 load, like a motor or a coil. And, in its simplest form,
6 it generates a square wave.

7 But it's common technique to pulse width modulate
8 that square wave to simulate the operation of a sine wave.
9 So, for example, if I were to play a perfect sine wave on
10 my computer right now and have it play out of the speakers,
11 there's not an amplifier there that could output a true
12 sine wave.

13 Instead, there's an amplifier that resembles the
14 H-bridge, a class D amplifier that would simulate the sine
15 wave. That's simply the way things have been done for many
16 years.

17 BY ATTORNEY RUBIN:

18 Q. What are other ways to produce an AC drive signal
19 without using an H-bridge?

20 ATTORNEY MARANDO: Objection. Form.

21 THE WITNESS: There are lots. You can use -- you
22 can use a capacitive inductive oscillator, a tuned circuit.
23 You can use a crystal oscillator. You can use a variety
24 of -- let's see. There are lots of ways to do it. You
25 could use an analogue digital converter. Use vacuum tubes.

1 The advantage of the H-bridge is that it's
2 effective from a single power supply, so it's particularly
3 attractive for anything that's powered by batteries.

4 BY ATTORNEY RUBIN:

5 Q. In paragraph 180 of your declaration, you refer to
6 an inverter, or to be more precise, you refer to inverters.

7 Do you see that?

8 A. Yes.

9 Q. There, are you referring to inverters as another
10 way?

11 A. Yes. In that case, I'm referring to a power
12 inverter, which is a name that's used for a
13 DC-to-AC-conversion device.

14 So, for example, if you were to buy something that
15 you could plug into the cigarette lighter of your car that
16 would output 120-volt wall power to run somewhere near a
17 device, we call those inverters, and they are also well
18 known.

19 And they, essentially, are not all that different
20 from an H-bridge, but they would -- depending on how
21 they're implemented. They can sometimes be implemented
22 with H-bridge-type technology or sometimes they are -- they
23 use other kinds of transformer-based circuits or other
24 kinds of more analog circuitry.

25 Q. And, earlier, you referred to using an H-bridge to

1 generate an AC signal from a -- using power from a battery.

2 Could you use an inverter to generate an AC signal using

3 power from a battery?

4 A. You could. Again, H-bridges are the more common

5 solution for driving things with coils in them, but you

6 could use an inverter.

7 ATTORNEY MARANDO: We've been going about an hour

8 almost ten minutes. So whenever it's good for a break.

9 ATTORNEY RUBIN: Yeah. Let's -- let's go off the

10 record.

11 (Time noted 10:11 a.m. PDT.)

12 (Recess taken.)

13 (Time noted 10:27 a.m. PDT.)

14 BY ATTORNEY RUBIN:

15 Q. I'd like to turn to paragraph 196 of your '992

16 declaration. And reading from the second sentence you say,

17 further, a POSITA would have found it obvious to combine

18 the separate oscillatory actuator hardware elements into

19 one that works with both sensors as a simple modification

20 of existing hardware and software elements.

21 Do you see that sentence?

22 A. I do.

23 Q. So how does combining the actuator hardware

24 elements into one that works with both sensors, how does

25 that relate to whether the combination satisfies claim 3?

1 ATTORNEY MARANDO: Objection. Form.

2 THE WITNESS: I think that all that I'm saying
3 here is that, in this embodiment, Fukumoto discloses
4 multiple oscillators. But Fukumoto also discloses that
5 individual oscillators can output complex patterns based on
6 a stored waveform that vary in frequency and amplitude.

7 And, therefore, a person of ordinary skill would
8 have understood that the capability is there to use either
9 one or more oscillators to do complex things, and it's a
10 simple design choice as to whether you combine the two
11 signals or whether you drive them to separate oscillators.

12 BY ATTORNEY RUBIN:

13 Q. So why is that -- why does that matter for your
14 opinions on obviousness in claim 3?

15 A. It probably --

16 Q. What's that --

17 (Clarification by the certified stenographer.)

18 BY ATTORNEY RUBIN:

19 Q. What's the sentence doing there?

20 A. I think it's simply there to show that if, in
21 fact, this is a 112, 6, element, that the difference
22 between what's literally described in Fukumoto and what's
23 literally described in the '081 Patent is insubstantial.

24 Q. I'd like to ask you about your opinions relating
25 to Fukumoto figure 83. For example, in your '992

1 declaration, on page 116, you see that?

2 A. Okay.

3 Q. So would you agree that in the embodiment
4 described in Fukumoto 83, the weight is moved by an
5 electrostatic force as opposed to an electromagnetic force?

6 ATTORNEY MARANDO: Objection. Form.

7 THE WITNESS: As implemented, that's true. Well,
8 let me take that back, because, as you said, it is not
9 true.

10 So the teachings of the figure 83 embodiment are
11 that the drive signal produces an electrostatic force to
12 move the weighted element. But sometimes the weighted
13 element moves in response to the springs 815A and 815B.
14 And that's the aspect of motion that I'm identifying in
15 figure 83 that a person of ordinary skill would have
16 understood and incorporated, that independent of where the
17 electronic or electromagnetic force comes from, Fukumoto
18 teaches and a person of ordinary skill would know that one
19 could balance those forces with opposing springs as is
20 shown in 815A and 815B.

21 BY ATTORNEY RUBIN:

22 Q. All right. So figure 83 in Fukumoto shows an
23 embodiment with two springs, one above the weight and one
24 below the weight. At least in the cross section shown
25 in 83; is that right? Figure 83.

1 A. As illustrated. Again, I don't know if there's
2 any reason to assume that the one side of this drawing is
3 up and down versus left and right, but there are two
4 springs, 815A and 815B, that are on opposite sides of the
5 moving weight.

6 Q. And would you agree that the specific embodiment
7 shown in figure 83 does not make use of magnetic fields
8 generated by foil that is --

9 ATTORNEY MARANDO: Objection --

10 THE WITNESS: That is true, but a person of
11 ordinary skill would understand that the cause of the
12 electromagnetic forces is unrelated to the behavior of the
13 spring forces.

14 (Clarification by the certified stenographer.)

15 ATTORNEY MARANDO: Form. Objection. Form.

16 BY ATTORNEY RUBIN:

17 Q. So would you agree that as the weight in figure 83
18 is oscillating, the forces that are applied to that weight
19 by the electrostatic -- withdrawn.

20 Would you agree that as the weight in figure 83 is
21 oscillating, the electrostatic forces that apply to that
22 weight vary as a function of time?

23 A. In normal operation, they would. And the spring
24 forces also would vary as a function of time.

25 Q. Okay. Now, would you agree that the average

1 acceleration on the weight, averaged over the period of
2 oscillation, is zero?

3 A. That's a very complicated analysis, and I don't
4 think you can get there. The average displacement is zero.
5 The average of the double integral of the acceleration
6 would be zero. But if you literally average the
7 acceleration, if you had perfect sine waves driving it,
8 that would be true. But in the real world, I don't know
9 that there's any reason to assume that that would be true.

10 (Clarification by the certified stenographer.)

11 BY ATTORNEY RUBIN:

12 Q. All right. Let's not assume that there are
13 perfect sine waves, but let's assume that the oscillation
14 is periodic. Perfectly periodic.

15 A. Uh-huh.

16 Q. Is that a reasonable assumption to make in the
17 context of figure 83?

18 ATTORNEY MARANDO: Objection. Form.

19 THE WITNESS: No. If it were perfectly symmetric
20 around zero and you had ideal materials, then I think you
21 would get an average acceleration of zero, but I'd have to
22 go through the math to be sure.

23 BY ATTORNEY RUBIN:

24 Q. Now, would you agree that there are certain points
25 in the motion of the weight where its instantaneous

1 velocity is zero?

2 ATTORNEY MARANDO: Objection. Form.

3 THE WITNESS: Yes. That would typically be the
4 case of the peaks.

5 BY ATTORNEY RUBIN:

6 Q. So the velocity is a continuous function of time.
7 There are points in the motion of the weight where the
8 velocity is down, at other points where it's up. So as
9 you're going from being down to up, there must be some
10 point in there where the velocity is instantaneously zero?

11 A. Yes. If you -- if you actually have an up-down
12 orientation, that would be true.

13 Q. Okay. So if I look at the interval time -- you
14 referred to the peaks of the motion -- withdrawn.

15 You refer to the peaks of the motion. So I take
16 it there that you're referring to the points in the motion
17 of the weight where the displacement from the neutral
18 position is the maximum.

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: Yes. That would be true. And,
21 again, that's assuming an idealized two-dimensional model.
22 If it's three-dimensional, in the real world, that may not
23 be true.

24 BY ATTORNEY RUBIN:

25 Q. Okay. So if we're looking -- withdrawn.

1 You'd agree that the motion that is described by
2 Fukumoto in the embodiment in figure 83 is a linear
3 vibrational motion?

4 A. As that term is normally used, yes.

5 Q. So that although there may be some motion in --
6 along other axes in a three-dimensional system, the
7 predominant motion of the system is linearly up and down,
8 at least in the cross section that's shown in figure 83?

9 ATTORNEY MARANDO: Objection. Form.

10 THE WITNESS: It would be my understanding, is
11 that if -- if you were in an up/down orientation, the bulk
12 of the motion in the Fukumoto figure 83 would be up and
13 down.

14 BY ATTORNEY RUBIN:

15 Q. All right. So focusing just on that up-and-down
16 motion figure 83, the predominant linear motion.

17 The peaks that you were referring to in your
18 testimony earlier are those points in the motion where the
19 vertical displacement of the weight reaches the maximum in
20 the upper direction or when it reached the maximum in the
21 downward direction.

22 Is that what you were saying --

23 ATTORNEY MARANDO: Objection. Form.

24 BY ATTORNEY RUBIN:

25 Q. -- you were referring to when you used the word

1 "peak"?

2 ATTORNEY MARANDO: Objection. Form.

3 THE WITNESS: Yes. That's just ordinary

4 oscillatory motion.

5 BY ATTORNEY RUBIN:

6 Q. Okay. So when the vertical displacement of the
7 weight in figure 83 reaches a peak value in one direction
8 or the other, at that moment in time, the vertical
9 component of the velocity of the weight is zero.

10 Would you agree?

11 ATTORNEY MARANDO: Objection. Form.

12 THE WITNESS: At that instant, yes.

13 BY ATTORNEY RUBIN:

14 Q. Okay. So if you look at the time between one peak
15 of the motion in the upper direction and the next peak of
16 the motion in the upper direction, so one instant in time
17 when the weight is as far up as it's going in that period
18 of oscillation, and then the next moment in time where the
19 weight is at its most upward position, at that period of
20 the oscillation, those are two points in time at which the
21 velocity of the weight is zero at each of those points --
22 correct? -- at least in the vertical direction?

23 ATTORNEY MARANDO: Objection. Form.

24 THE WITNESS: Again, all this is only true for the
25 exemplary sine wave drive signal that's shown. Fukumoto

1 talks about complex drive signals in which you may not have
2 those kinds of behaviors.

3 BY ATTORNEY RUBIN:

4 Q. Right.

5 But you would agree that --

6 (Clarification by the certified stenographer.)

7 BY ATTORNEY RUBIN:

8 Q. -- regardless of how complex the behavior of the
9 drive signal is, there will be points in time when the
10 weight changes from moving in an upward direction to moving
11 in a downward direction, right?

12 ATTORNEY MARANDO: Objection. Form.

13 THE WITNESS: In practice over time, yes.

14 BY ATTORNEY RUBIN:

15 Q. And at each of those points in time where the
16 weight changes from moving up to moving down, there would
17 be an instant where the vertical velocity is zero?

18 ATTORNEY MARANDO: Objection. Form.

19 THE WITNESS: Yes. As I said, I believe that's
20 true for any oscillating system, including the ones that
21 are disclosed in the '081 Patent.

22 (Clarification by the certified stenographer.)

23 BY ATTORNEY RUBIN:

24 Q. So if I look at the period of time between one
25 peak where vertical velocity is zero and a subsequent peak

1 where the vertical velocity is zero, at those two points in
2 time, the velocities are the same. The vertical velocities
3 are the same. The vertical velocity is zero at both of
4 those points in time, right?

5 ATTORNEY MARANDO: Objection. Form.

6 THE WITNESS: If the vertical velocity is zero at
7 two points in time, then the vertical velocity is the same
8 at those two points in time.

9 BY ATTORNEY RUBIN:

10 Q. All right. So if I average the acceleration
11 experienced by the weight, over that period of time,
12 between the first instant where the vertical velocity is
13 zero and a second instant where the vertical velocity is
14 zero, the average acceleration over that period of time
15 will be zero, right?

16 ATTORNEY MARANDO: Objection. Form.

17 THE WITNESS: I'm having problems with the word
18 "average." I mean, from a mathematical perspective, if you
19 take the integral of the vectors over that time, the
20 integral will be zero.

21 BY ATTORNEY RUBIN:

22 Q. And if the integral of the acceleration
23 experienced by the weight over that period of time is zero,
24 then the integral of the net force experienced by the
25 weight over that period of time will also be zero, correct?

1 ATTORNEY MARANDO: Objection. Form.

2 BY ATTORNEY RUBIN:

3 Q. That's just Newton's second law.

4 A. Yes. With the very important understanding that
5 net force is a complex concept that is different from the
6 applied force.

7 Q. So among the forces applied to the weight in
8 figure 83 are electrostatic forces between the electrodes.

9 Would you agree?

10 A. That is one of the forces that's present in the
11 figure 83 embodiment.

12 Q. Okay. Another one of the forces experienced by
13 the weight in the figure 83 embodiment is the force from
14 each of the springs.

15 A. Yes.

16 Q. And no other one of the other forces experienced
17 by the weight in figure 83 would be the force of gravity;
18 is that right?

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: Again, it depends on the direction
21 that the device is oriented. And I assume you -- I assume
22 you're still operating under the assumption that we're only
23 talking about the primary direction at this point. Not --
24 not the forces in and out of the page.

25 BY ATTORNEY RUBIN:

1 Q. Now, in the sentence right above figure 83, you
2 say, quote, a POSITA would have been motivated to modify
3 the figure 3 embodiment by placing a spring on the other
4 end of the moveable weight to double the force of vibration
5 created for greater effect while requiring less power as
6 Fukumoto depicts in figure 83.

7 Do you see that?

8 (Clarification by the certified stenographer.)

9 THE WITNESS: Yes.

10 BY ATTORNEY RUBIN:

11 Q. Now, the force on the spring is commonly described
12 by -- or at least approximated by something called Hooke's
13 law; is that right?

14 A. On an ideal spring.

15 Q. So, according to Hooke's law, the force exerted by
16 a spring is approximately a number --

17 (Clarification by the certified stenographer.)

18 BY ATTORNEY RUBIN:

19 Q. -- referred to as the spring constant times the
20 displacement of the spring; is that right?

21 A. According to Hooke's law, it's exactly the spring
22 constant times the displacement of the spring. In the real
23 world, there are other factors that come into play.

24 Q. But you would agree that the force exerted by a
25 spring does depend on how far that spring is displaced from

1 its neutral displacement?

2 A. Yes.

3 Q. And so when you say that adding a second spring,
4 as shown in Fukumoto figure 83, would double the force of
5 vibration, that would only be true if the displacement of
6 the spring isn't changed as a result of the modification.

7 Would you agree?

8 ATTORNEY MARANDO: Objection. Form.

9 THE WITNESS: That's correct.

10 BY ATTORNEY RUBIN:

11 Q. And it would also -- so, really, there are two
12 assumptions that go into this statement that the forces is
13 doubled. Number 1, that usually the spring has the same
14 spring constant as the single spring had, and, number 2,
15 that the displacement is the same as it was for the single
16 spring. If either of those assumptions isn't true, then it
17 may not be true that the force doubles from adding a second
18 spring, right?

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: That's correct. A designer could
21 make many modifications to those springs.

22 BY ATTORNEY RUBIN:

23 Q. So, in order to have the same displacement in the
24 embodiment with two springs, as you had in the embodiment
25 with one spring, you would agree that the force that causes

1 the displacement would have to be greater?

2 A. Yeah. That's the whole point, right? Is that --
3 is that you can move more mass with more force, and that
4 you can -- with the same amount of space, you can apply
5 larger forces and, therefore, create a stronger vibration
6 effect, which would be one of the motivations to do this.

7 I mean, in practice, providing support on both
8 sides to remove any harmonics or nonlinear vibrations is
9 probably also a good motivation.

10 Q. So the -- in addition to changing the --
11 withdrawn.

12 So figure 82 of Fukumoto has an embodiment which
13 is similar in some ways to figure 83 except that it's only
14 one spring instead of two and the electrodes are only on
15 one side of the weight as opposed to both sides.

16 Would you agree?

17 ATTORNEY MARANDO: Objection. Form.

18 THE WITNESS: I think that's correct.

19 BY ATTORNEY RUBIN:

20 Q. So the -- the greater force of vibration, or the
21 larger mass that you referred to, in going from Fukumoto
22 figure 82 to Fukumoto figure 83, is a result both of
23 doubling the number of springs and doubling the number of
24 electrodes.

25 Would you agree?

1 ATTORNEY MARANDO: Objection. Form.

2 THE WITNESS: In this particular set of -- well,
3 it's not really doubling the number of electrodes. It's
4 doubling the electrode force.

5 Now, this -- in this particular detailed design,
6 they've chosen to do that by doubling the number of
7 electrodes, but you could also just put twice the energy
8 into the original set of electrodes. Either way, it would
9 work fine.

10 I mean, the whole point of 82 and 83 really is to
11 illustrate that this is a simple design choice to as to
12 whether or not to put all the energy in from side or all
13 the energy in for -- or half the energy from each side, and
14 that there are some advantages to doing it from both sides
15 because of the increased stability.

16 BY ATTORNEY RUBIN:

17 Q. Would you agree that the power required --
18 withdrawn.

19 Would you agree that the instantaneous power
20 exerted on a moving mass is equal to the force on that mass
21 times its velocity?

22 ATTORNEY MARANDO: Objection. Form.

23 (Clarification by the certified stenographer.)

24 THE WITNESS: That's right.

25 BY ATTORNEY RUBIN:

1 Q. So if I leave the velocity of a particular
2 oscillation as a function of time unchanged but double the
3 force required to produce that oscillation, that's going to
4 require double the power, correct?

5 A. In an ideal situation, yes.

6 Q. So would you agree that, in general, increasing
7 the force of vibration in a system like Fukumoto's is going
8 to require increasing the power, not decreasing the power?

9 A. Yes. In general, a stronger vibration is going to
10 require more power. Now, of course, in an ordinary design
11 cycle, somebody would evaluate that, and they would think
12 about all the alternatives where they either decided it was
13 important to have a stronger vibration and therefore to use
14 more power, or that it wasn't important, and each electrode
15 and each spring could be made smaller since there were more
16 of them, and that that may be a preferable design.

17 Q. So, in the sentence from your paragraph on page
18 116 of your 992 declaration I read from earlier, you refer
19 to doubling the force of vibration created for greater
20 effect while requiring less power.

21 You don't actually show that doubling the number
22 of springs and doubling the force of vibration would result
23 in lower power requirement in Fukumoto, do you?

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: I think the whole point here is that

1 it's less than doubling it with a single spring, because
2 you'd have to make that single spring heavier and thicker,
3 and it would have mass, which I think is kind of just a
4 natural conclusion.

5 But I don't do any kind of a quantitative analysis
6 here. And, again, this is only one of the motivations.
7 Again, I think the first motivation is probably the
8 stronger one, that you want to distribute the forces and
9 not have the entirety of the forces be distributed the
10 spring.

11 (Clarification by the certified stenographer.)

12 BY ATTORNEY RUBIN:

13 Q. As a general matter, do two springs have greater
14 mass than one spring?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: Depends on the design of the
17 springs, right? If they have the same spring constant,
18 then two would have more. But if you want to have the same
19 amount of energy, then you have to do a much more
20 complicated analysis, and you would typically need a
21 stronger -- stronger spring constant on the single spring,
22 and that can cause it to have greater mass.

23 (Clarification by the certified stenographer.)

24 ATTORNEY RUBIN: Yeah, sure.

25 ATTORNEY MARANDO: Yes.

1 (Clarification by the certified stenographer.)

2 (Time noted 11:04 a.m. PDT.)

3 (Discussion held off the record.)

4 (Time noted 11:05 a.m. PDT.)

5 BY ATTORNEY RUBIN:

6 Q. All right. Bear with me just a minute.

7 All right. So let's turn to paragraph -- the
8 section starting on page 146 of your declaration. So here
9 you describe a combination of Fukumoto and Erixon.

10 Do you see that?

11 A. Yes.

12 Q. And, actually, I should ask you. Do you know how
13 the second reference's name is actually pronounced?

14 A. I don't. I assumed it was Erixon.

15 Q. That's E-r-i-x-o-n.

16 So I'm trying to understand what is the
17 combination that you -- well, withdrawn.

18 I'm trying to understand what is the structure
19 that you think would result when a person of ordinary skill
20 in the art combined Fukumoto with Erixon. So I take it
21 that you're describing a combination of the figure 3
22 embodiment of Fukumoto with Erixon; is that right? Or is
23 there some other embodiment of Fukumoto that you think a
24 person skilled in the art --

25 A. It is -- it is the figure 3 embodiment.

1 Q. So I take it that you're not suggesting taking
2 Erixon's electromagnetic vibrator and bodily incorporating
3 it into what's in figure 3 or is that what you're
4 suggesting?

5 ATTORNEY MARANDO: Objection. Form.

6 THE WITNESS: Let me pull the claim. Just a
7 second.

8 So I think I've already explained earlier in the
9 declaration that I do think that Fukumoto as a whole
10 literally makes claim 7 and claim 8 obvious just from its
11 own teachings.

12 But I also believe that if there were any doubt,
13 that all the teachings of Fukumoto would -- are not
14 literally tied to the exact geometry. And figure 83 shows
15 us some of that.

16 But, also, Erixon shows us that the same
17 principles would hold in a geometry that is less like a
18 phone and more like a tube. And that's the intent, is that
19 we take all the teachings of Fukumoto and we -- rather than
20 putting them into a phone or a PDA or a handheld device
21 form factor into like figure 3 of Fukumoto, but instead we
22 put them into a tube form factor as is described in Erixon,
23 and it's essentially the same components.

24 And what Erixon does is, rather than a person of
25 ordinary skill having to go in and take their knowledge and

1 the teachings of Fukumoto and draw out the magnetic fields
2 and the magnetic forces, Erixon actually illustrates them.
3 So that's the primary teaching here.

4 I explain elsewhere that there are some real
5 problems with claim 7 in terms of its language and whether
6 or not there's written description support. But -- but the
7 teachings in Erixon are exactly the same as the ones in
8 the '081 Patent with respect to these issues.

9 Q. And, I'm sorry. You referred to some opinions
10 about a lack of written description support for claim 7.
11 Where is that in your declaration?

12 A. Where is that?

13 Q. I'll confess, I haven't memorized all --

14 A. Me either.

15 Q. -- 216 pages.

16 A. It's on page 108.

17 Q. So where is the -- where are your opinions about
18 lack of written description?

19 A. Well, the actual disclosure is of a magnetic force
20 that's --

21 (Clarification by the certified stenographer.)

22 THE WITNESS: -- that is generated in a direction
23 parallel to the axis of the cylindrical chamber. And
24 that's at -- in the '081 Patent at column 5, lines 5
25 through 10.

1 I couldn't find any description of a magnetic
2 field that would be parallel to the direction of motion of
3 the -- of the movable element. And it wouldn't -- the
4 magnetic field is always perpendicular to the magnetic
5 force. So in some sense, it doesn't even really make a
6 whole lot of sense, but that's what was claimed.

7 Either way, the designs in the prior art,
8 particularly the Erixon design, is identical to the
9 disclosed design. So it would be obvious to build what was
10 in the '081 Patent.

11 If you look at figure 4B, you can see that the
12 magnetic field is circular.

13 Q. You're referring to 4B of the '081 Patent; is that
14 right?

15 A. Yeah. And, unfortunately, it uses the same number
16 for two different things. But --

17 Q. What number is that?

18 A. 424.

19 Q. What are the two different things?

20 A. Well, the magnetic field B is labeled 424, but the
21 magnetic force is also labeled 424. That could have been
22 what confused the drafter.

23 Q. So do you have an understanding of what
24 material -- what type of material the movable mass 404 in
25 the '081 and '830 Patent says?

1 ATTORNEY MARANDO: Objection. Form.

2 THE WITNESS: In column 4, it's just described as
3 a solid cylindrical mass.

4 BY ATTORNEY RUBIN:

5 Q. What line in column 5 are you referring to?

6 A. I'm sorry. Are we talking about the reference in
7 column 4 to the solid cylindrical mass or column 5 to the
8 corresponding magnetic force?

9 Q. Well, I may have misheard you. But I think you're
10 saying that -- or you're pointing out that element 404 is
11 referred to as a cylindrical mass, for example?

12 A. Yeah. That's column 4, line 50.

13 Q. Thank you.

14 Now, would you agree that in column 5 --
15 withdrawn.

16 Would you agree that in column 4, line 52 to 53,
17 the '081 Patent says, quote, the weight is a magnet?

18 A. It does say that.

19 Q. So would one skilled in the art understand that
20 that's saying the weight is made of a ferromagnetic
21 material?

22 (Clarification by the certified stenographer.)

23 ATTORNEY RUBIN: Ferro, f-e-r-r-o, magnetic.

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: That sentence is a little bit

1 awkward. So it's not clear to me whether that's saying
2 that it's always a magnet or that it can be a magnet in
3 some embodiments.

4 BY ATTORNEY RUBIN:

5 Q. And -- withdrawn.

6 I think earlier you said that the force from a
7 magnetic field is always perpendicular to the direction of
8 the field; is that right?

9 A. The direction of the force generated by that
10 magnetic field.

11 Q. So you're saying that the direction of the force
12 generated by a magnetic field is perpendicular to the
13 direction of the magnetic field?

14 A. That's my understanding. And, again, remember, in
15 claim 7, we're not talking about the magnetic field of the
16 magnet. It's specific to the magnetic field generated by
17 the coil.

18 (Clarification by the certified stenographer.)

19 BY ATTORNEY RUBIN:

20 Q. Now, I would agree with you that the force on a
21 moving charge from a magnetic field is perpendicular to
22 both the direction of the magnetic field and the velocity
23 of the moving charge.

24 Now, suppose that you've got a magnetic dipole
25 that's in a magnetic field. Is your understanding that the

1 force of the magnetic dipole is also perpendicular to the
2 direction of the magnetic field?

3 ATTORNEY MARANDO: Objection. Form.

4 THE WITNESS: Yes.

5 BY ATTORNEY RUBIN:

6 Q. And, if so, there are an infinite number of
7 directions perpendicular to the magnetic field, which
8 direction is the force in?

9 A. No. That's not the case for a magnetic dipole.
10 But, again, it doesn't change the disclosure of the
11 specification where it talks about 424 being the force.
12 And it doesn't talk about the direction of the magnetic
13 field from the coil.

14 And, in fact, it illustrates the magnetic field
15 from the coil as being circular. So it's not even clear
16 from the claim where one would measure that direction.

17 Q. All right. So looking at the magnetic coil in
18 Erixon.

19 A. Uh-huh.

20 Q. So you annotate a figure that shows the magnetic
21 field along the axis through the center of that coil
22 pointing in a particular direction.

23 You would agree that at points other than along
24 the central axis of the coil, the magnetic field generated
25 by the coil in that Erixon points in different directions?

1 A. Yes. But a key point is it's the identical
2 design. It's the same behaviors as disclosed in the
3 patent. So whether the language of the claim is wrong or
4 the language of the claim is right, Erixon discloses it in
5 either case.

6 Q. So would you agree that for the coil shown in
7 figure 4 of the '081 Patent or the '830 Patent, as the same
8 figure, that the magnetic field along the axis that passes
9 through the center of the coil points in the same direction
10 as -- points in a direction parallel to that axis?

11 A. If you measure it only at that one point, that
12 would be true. And, again, Erixon discloses the exact same
13 thing.

14 Q. So if you measure the magnetic field on -- at any
15 point along the axis through the center of the coil in the
16 challenged patents, that magnetic field will point in a
17 direction parallel to that axis, right?

18 A. No. I think you have to measure it exactly at the
19 center.

20 Q. Exactly at the center?

21 A. Like it's a curve. So there is a point at which
22 it's going to point in that direction.

23 Q. And the direction that it points in that is the
24 direction the magnetic field points in at that point is the
25 same direction as the challenged patents say is the

1 direction of the force on the moving mass, correct?

2 ATTORNEY MARANDO: Objection. Form.

3 THE WITNESS: Yes. It's a circle. So there
4 exists a point at which it's pointing in the same direction
5 as the moving mass. Again, that's not really disclosed in
6 the spec, but -- but it would exist.

7 BY ATTORNEY RUBIN:

8 Q. So a person skilled in the art of the challenged
9 patents here would understand what the magnetic field is of
10 an electromagnetic coil as a function of position, correct?

11 ATTORNEY MARANDO: Objection. Form.

12 THE WITNESS: In figure 4, I think they generally
13 would. That's just an ordinary solenoid coil that's a
14 common design. There's nothing new about that. And I
15 think a person of ordinary skill could understand it and
16 model it.

17 BY ATTORNEY RUBIN:

18 Q. And the magnetic field generated by a solenoid --
19 withdrawn.

20 The magnetic field generated by a current flowing
21 through a solenoid is a very standard subject to study in
22 an introductory electromagnetic -- electromagnetism course.

23 Would you agree?

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: It would be.

1 BY ATTORNEY RUBIN:

2 Q. And a person skilled in the art would understand
3 that the magnetic force exerted on a permanent magnet would
4 be parallel to the direction of the magnetic field exerted
5 on that permanent magnet, correct?

6 ATTORNEY MARANDO: Objection. Form.

7 THE WITNESS: It is true in terms of the net
8 forces. Again, there's complex integral whenever something
9 is three-dimensional or even two-dimensional, but, in
10 general, that would be the direction of the force.

11 BY ATTORNEY RUBIN:

12 Q. Fair enough. I won't ask you to do any
13 three-dimensional integrals on the fly.

14 So, I guess, turning back to the question of
15 geometry of the combination you're proposing between
16 Fukumoto and Erixon. How would you describe the resulting
17 geometry from the combination that you propose?

18 ATTORNEY MARANDO: Objection. Form.

19 THE WITNESS: So the teachings of Fukumoto are not
20 really specific to one geometry. But the illustrated
21 embodiment in figure 3 is suggested to be in a PDA or a
22 phone. We only see a cross section, which we -- could be
23 consistent with various geometries, but I think the
24 presumption would be that it would be more of a square
25 shape, that it's moving back and forth within a square or

1 rectangular cavity.

2 But there's absolutely nothing that would stop you
3 from taking all of those teachings and putting them into a
4 round cavity, and that would be a pretty obvious thing to
5 do. People know that cavities come in different extruded
6 shapes.

7 And a person who was looking to understand the
8 direction of the magnetic forces in a round cavity
9 implementation would look towards Erixon to see
10 illustrations of those magnetic fields and forces.

11 But the only actual modification that's being
12 suggested is that instead of it being a square device or
13 rectangular device moving back and forth in a square or
14 rectangular extrusion, it would be a round device going
15 back and forth in a round extrusion.

16 BY ATTORNEY RUBIN:

17 Q. So would the device resulting from the combination
18 you propose between Fukumoto and Erixon have a touch
19 screen?

20 A. Sure. You could have something round. The touch
21 screen on top of my watch does.

22 Q. And so where would that touch screen be relative
23 to the Erixon magnetic coil?

24 A. On one of the ends, just as it's illustrated in
25 figure 3. And, again, the Erixon illustration shows

1 something longer than it is wide. But there's no
2 limitation or teaching that it would be longer than it is
3 wide. It could be wider than it is long.

4 Q. So do you think that a person skilled in the art
5 combining Fukumoto and Erixon as you propose would make the
6 Erixon cavity into one that's wider than it is long?

7 A. In view of figure 3 of Fukumoto where the cavity
8 is shown that way, sure.

9 Q. And so in the combination you're proposing between
10 Fukumoto and Erixon, do you believe that the direction of
11 motion of the weight would be perpendicular to the surface
12 of the screen?

13 ATTORNEY MARANDO: Objection. Form.

14 THE WITNESS: If, by that, you mean towards and
15 away from the surface of the screen, yes.

16 BY ATTORNEY RUBIN:

17 Q. In the geometry that would result from combining
18 Fukumoto and Erixon as you propose, is there still a spring
19 or multiple springs connecting the movable mass to the
20 housing?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: (In sotto voce.)
23 (Clarification by the certified stenographer.)

24 THE WITNESS: Yes. In figure 5 in Erixon, it
25 illustrates that kind of an embodiment. Again, it's side

1 to side here rather than up and down, but in the
2 combination, you could do it either way.

3 Figure 6 also depicts the embodiment in which
4 magnets are used instead of springs which would also be
5 obvious.

6 ATTORNEY RUBIN: Would now be a good time to take
7 a break?

8 ATTORNEY MARANDO: That would be fine.

9 (Time noted 11:38 a.m. PDT.)

10 (Lunch recess taken.)

11 (Time noted 12:32 p.m. PDT.)

12 BY ATTORNEY RUBIN:

13 Q. The date on your -- I'm looking at your
14 declaration in the '992 IPR, the date listed on it is
15 June 14th, 2023. And on that date, do you know how many
16 declarations you submitted for Samsung IPRs against
17 Resonant Systems?

18 A. I don't remember if they were all on the same
19 date. I think I did three all together.

20 Q. So you did three declarations on or about
21 June 14th, 2023; does that sound right?

22 A. With respect to the Resonant patents, yes.

23 Q. How many hours did you spend working on those
24 declarations to the point they were submitted?

25 A. I don't remember.

1 Q. What would be your best estimate based on what you
2 do remember?

3 A. Nine months ago. I don't remember.

4 Q. Was it more than five hours?

5 A. Certainly more than five hours, but...

6 Q. More than six hours?

7 A. Yeah. It was -- again, I don't remember. I'm
8 sure was many tens or hundreds of hours, but I don't
9 remember the specificity.

10 Q. Many tens or hundreds. So it might have been less
11 than 100 hours?

12 A. Possible. I don't remember. Again, it was a long
13 process. Started with a number of discussions identifying
14 art, searching for references. So it was a process that
15 went on over a period of time, and I don't have a sense of
16 how many hours there were in total.

17 Q. Do you recall when you were retained by the
18 Samsung petitioners to work on these IPRs?

19 A. No. Not with any specificity. It was less than a
20 year before I submitted the petition, but I don't remember
21 specifically when during the year it was.

22 Q. So if I asked you to estimate the number of months
23 before June 2023 you were engaged to work on these IPRs, is
24 there any estimate you can give me beyond that it was less
25 than 12 months?

1 A. I mean, it was somewhere between 2 and 12, but I
2 don't remember specifically. I don't remember -- yeah.
3 Again, don't remember whether we did the work continuously
4 or whether it was spread out. I don't recall.

5 Q. You referred to identifying prior art. Did you do
6 searching to identify prior art that was used in these
7 petitions?

8 A. Yes.

9 Q. Do you remember any specific prior art references
10 that you discussed that you had identified initially?

11 A. I don't recall if it was any of the primary ones
12 that we ended up relying on. I know that many of the
13 diagrams that are in the declaration for illustrative
14 purposes were things that I found or used that I know that
15 I identified some other art that doesn't appear in these
16 two petitions, but I don't recall whether or not I was the
17 first to identify any of the references that are actually
18 in the combinations.

19 Q. What did you do to -- pardon me.
20 What did you do to prepare for today's deposition?

21 A. Well, preparing the declarations, of course, and
22 the research I did behind them was part of the preparation.
23 But, more recently, I read the back-and-forth with the
24 PTAB, including their initial decisions, the institution
25 decisions; the patent owner's responses; the patents and

1 the major cited art; the thing that -- ones that I
2 mentioned being printed out before; and my own
3 declarations. And then I had couple hours of discussion
4 with Mr. Marando.

5 Q. When was that couple hours of discussion with
6 Mr. Marando?

7 A. What was it?

8 Q. When?

9 A. Oh, when was it. Yesterday and the day before.

10 Q. Excluding the time that you spent preparing the
11 declarations initially, how much time did you spend
12 preparing for today's deposition?

13 A. Again, I don't have it all added up, but probably
14 between 10 and 20 hours.

15 Q. Turning back to your declaration, if I could ask
16 you to turn to page 98 of your '992 declaration.

17 (Clarification by the certified stenographer.)

18 THE WITNESS: Okay.

19 BY ATTORNEY RUBIN:

20 Q. So in paragraph 1 -- I'm sorry. Withdrawn.

21 In paragraph 184, you talk about an oscillator
22 chip called the Exar XR8038. Is that chip a -- withdrawn.

23 Is that chip an 8th --

24 Is that trip -- withdrawn.

25 Is that chip an H-bridge?

1 A. No. I don't believe so. It's been a long time
2 since I looked at the transistor diagram of that chip, but
3 my recollection is that it's -- it's a more traditional
4 oscillator with a waveform-shaping function.

5 Q. When you say a more traditional oscillator, how
6 does a more traditional oscillator work?

7 A. It's typically an electrical circuit that takes
8 advantage of a second order derivative to create a signal
9 that will change back and forth. That would be a sine wave
10 oscillator.

11 A -- again, there are different kinds. A square
12 wave oscillator is simply a -- can be a digital or analog
13 circuit that just switches a transistor on and off at a
14 periodic time.

15 Again, that period is usually determined by the
16 time constant of a resistor and a capacitor or a resistor
17 and an inductor. In this case, it's a resistor and a
18 capacitor.

19 Q. When you say, in this case, it's a resistor and a
20 capacitor, are those the externally attached capacitor C,
21 and then would it be the externally attached resistor RA?

22 A. You know, I haven't looked at this data sheet in a
23 long time. I think that's probably right. And RB probably
24 has to do with amplitude, but I'd have to check the data
25 sheet to be sure.

1 Q. So when you say that --

2 A. I mean, the data sheet's an exhibit. We can
3 certainly look at it if you'd like.

4 Q. When you say that the -- that a traditional
5 oscillator would be an electrical circuit that takes
6 advantage of the second order derivative, can you explain
7 that? In what sense does the oscillator take advantage of
8 a second order derivative?

9 (Clarification by the certified stenographer.)

10 THE WITNESS: So, again, there are many different
11 oscillator designs. They are all well known. You can go
12 get a textbook on oscillators, and you can get one in the
13 1950s.

14 But, essentially, there's a time constant here
15 that is -- that is being used to measure the rate of change
16 of some type of a charge storage element, either a
17 capacitor or an inductor.

18 And, again, there are a bunch of different
19 oscillator designs. I don't recall exactly which one is in
20 XR8038.

21 But, typically, you would charge the capacitor to
22 generate a sine wave. You would keep charging that
23 capacitor. And, at some point, you would start -- when it
24 crosses some threshold of zero, you would start discharging
25 it, but there would still be some continuation of the

1 signal.

2 So, essentially, it's going to oscillate. It's an
3 exact analog to the way a spring oscillates only using
4 current instead of physical motion.

5 BY ATTORNEY RUBIN:

6 Q. I'd like to ask about Ground 1J, a combination of
7 Fukumoto and Fuller.

8 And so here you talk about some combination of
9 teachings in Fukumoto with the electromagnetic vibrator
10 shown in Fuller figure 2.

11 Would you agree with what I just said?

12 A. Figures 1 and 2, they both describe the same
13 device.

14 Q. Fair enough.

15 So I'd like to understand what is the geometry of
16 the structure that you think the POSITA would arrive at by
17 combining Fukumoto with Fuller. What does that combination
18 look like?

19 (Clarification by the certified stenographer.)

20 THE WITNESS: Well, I think that there are
21 multiple geometries that would be obvious because neither
22 one of them is limited to a very specific geometry. But it
23 would be obvious to take the magnetic bumpers from Fuller
24 and use them in place of the single spring in Fujimoto
25 [sic]. And that can be done either in the geometry of

1 Fukumoto where you're moving away from and towards the
2 touch screen, or it can be done in the geometry of Fuller
3 where you're moving back and forth through a longer cavity.
4 Either one would be obvious here. I focused on the first
5 one in my declaration.

6 BY ATTORNEY RUBIN:

7 Q. When you say you focused on the first one in your
8 declaration, is there something that you can point me to in
9 your declaration that's describing the second one?

10 A. Well, again, it's not -- the geometry is not
11 really important to anything in the claim. Fukumoto
12 doesn't say that one -- that there's a need for a
13 particular geometry. Fuller doesn't say there's a need for
14 a particular geometry.

15 They're both more focused on -- Fukumoto is more
16 focused on the overall combination of elements. And Fuller
17 is more focused on the negative feedback mechanism from the
18 bumper magnets.

19 So I don't know that it's particularly important
20 to the claims or a person of ordinary skills understanding
21 what shape it would be, but I think it would be obvious,
22 again, to make it any shape that would -- that would work
23 in Fukumoto.

24 Q. In the last sentence of paragraph 267, you say,
25 quote, additionally, a POSITA would have been motivated to

1 make this combination to reduce the size of the linear
2 oscillatory actuator and efficiency, thus improving battery
3 life of the mobile device.

4 Do you see that?

5 A. Uh-huh.

6 Q. So at least this sentence seems to assume
7 something about the geometry of the combination. Namely,
8 it seems to -- it's making a statement about the size of
9 the actuator and the resulting geometry.

10 Why is that?

11 A. Because the spring typically will take up more
12 space than a magnet. And it also gives the opportunity to
13 put something cylindrical into something like a phone that
14 wouldn't necessarily increase its depth.

15 Q. So in this sentence where you're saying the size
16 of the linear oscillatory actuator is reduced, what is the
17 geometry of the combined linear oscillatory actuator
18 resulting from Fukumoto and Fuller that you're
19 contemplating?

20 A. Well, the geometry is --

21 (Clarification by the certified stenographer.)

22 ATTORNEY MARANDO: Objection. Form. Sorry.

23 THE WITNESS: The geometry is not limited. In the
24 simplest case, you would simply replace the spring in the
25 existing Fukumoto design with the bumper magnets --

1 (Clarification by the certified stenographer.)

2 THE WITNESS: But you could also incorporate more
3 of Fuller's teachings in and incorporate its shape as an
4 alternative as well. And that would still be within what's
5 obvious in light of the two references.

6 BY ATTORNEY RUBIN:

7 Q. I mean, what I understand you to be making a claim
8 about what the geometry of the combination would look like,
9 and that's what the size of the actuator in the combination
10 looks like.

11 And are you saying that any way of combining
12 Fukumoto with Fuller would result in an actuator of a
13 smaller size?

14 ATTORNEY MARANDO: Objection. Form.

15 THE WITNESS: No. I'm simply saying one
16 motivation to do this might be that one could implement the
17 magnets with a smaller size in the spring.

18 BY ATTORNEY RUBIN:

19 Q. And so I'm assuming that you have in mind some
20 configuration that uses magnets instead of a spring that
21 has a smaller actuator than what's in Fukumoto.

22 What is that configuration you have in mind?

23 ATTORNEY MARANDO: Object to form.

24 THE WITNESS: It would be substituting the bumper
25 magnets from Fuller for the spring in Fujimoto [sic].

1 BY ATTORNEY RUBIN:

2 Q. And in that combination that you just described,
3 is the movement of the weight still in a direction
4 perpendicular to the surface of the touch screen?

5 (Clarification by the certified stenographer.)

6 ATTORNEY MARANDO: Objection. Form.

7 THE WITNESS: In that particular combination, it
8 would be.

9 BY ATTORNEY RUBIN:

10 Q. So you say that the combination would, quote,
11 reduce the size of the linear oscillatory actuator and
12 efficiency, thus producing -- I'm sorry -- thus improving
13 battery life of the mobile device.

14 Do you see that?

15 A. Yes.

16 Q. So how would the combination reduce efficiency?

17 ATTORNEY MARANDO: Objection. Form.

18 THE WITNESS: Yeah. I think the statement was --
19 it's a little awkward. I think the intention was it would
20 reduce the size and improve the efficiency.

21 BY ATTORNEY RUBIN:

22 Q. Do you explain in your declaration how it would --
23 how the combination would improve the efficiency?

24 A. Improves the efficiency because you're not moving
25 the mass of the spring anymore.

1 Q. But would you agree that changing the amount of
2 mass that's moving is going to change the vibration
3 experienced by the user?

4 (Clarification by the certified stenographer.)

5 ATTORNEY MARANDO: Objection. Form.

6 THE WITNESS: I think the vibration is generally
7 based on the unsprung mass. In other words, the free mass,
8 not the mass of the spring that's moving. At least that's
9 usually the way that we would model it.

10 BY ATTORNEY RUBIN:

11 Q. Well, imagine you had a system where all of the
12 mass that was moving was a spring. That movement could
13 still create a vibration of the housing that would be felt
14 by the user, right?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: I suppose so. That's an unusual
17 design that I haven't really done any analysis on.

18 BY ATTORNEY RUBIN:

19 Q. So when you say that you would -- the way you
20 would model it is considering just the sprung mass, is that
21 because you think the contribution of the moving mass in
22 the spring to the vibration is small compared to the
23 contribution of the sprung mass or because the contribution
24 of the moving mass in the spring is zero?

25 ATTORNEY MARANDO: Objection. Form.

1 THE WITNESS: Obviously, it's not zero. Nothing
2 in physical world is zero. But I think that it's small
3 enough that we would often treat it as negligible.

4 BY ATTORNEY RUBIN:

5 Q. So you don't offer any opinions in this
6 declaration that would quantify how much the size of the
7 actuator is reduced due to the combination of Fukumoto with
8 Fuller or how much the efficiency changes, do you?

9 ATTORNEY MARANDO: Objection. Form.

10 THE WITNESS: No. I don't quantify them. Again,
11 the primary issue here is that these are known
12 alternatives.

13 BY ATTORNEY RUBIN:

14 Q. So turning to Ground 1M. You talk about modifying
15 Fukumoto in view of NPO Dong and Ogusu. Now, in Dong,
16 there is teachings concerning paramagnetic material, and in
17 Ogusu, there is teachings concerning a yoke made of a
18 ferromagnetic material or nonmagnetic ferromagnetic
19 material mixed with ferromagnetic powders.

20 Do you recall that?

21 (Clarification by the certified stenographer.)

22 THE WITNESS: That question got too complicated.

23 BY ATTORNEY RUBIN:

24 Q. Yeah. I'll withdraw the question then, and we can
25 talk about specific paragraphs.

1 Okay. So in paragraph 277 of your '992
2 declaration, you discuss Dong and say that in Dong, the
3 counterweight is -- can be composed of a paramagnetic
4 material.

5 A. Yes. In particular, tungsten.

6 Q. And now in Ogusu -- withdrawn.

7 In paragraph 279, you say that Ogusu describes a
8 yoke made of ferromagnetic material or non-ferromagnetic
9 materials mixed with ferromagnetic powders.

10 Do you see that?

11 A. Yes.

12 Q. Now, this ground that you discuss Dong and Ogusu
13 in the context of is challenging claim 14 which requires a
14 paramagnetic material.

15 Would you agree?

16 A. Yes.

17 Q. So is it your opinion that a ferromagnetic
18 material is a paramagnetic material?

19 A. No. A mixture of a ferromagnetic material and a
20 non-ferromagnetic material for the purposes of creating a
21 reduced reluctance, which is disclosed in Ogusu, would be
22 equivalent to a paramagnetic material.

23 Looking back, it's not completely clear to me why
24 I needed to combine it with both since I think neither of
25 the secondary references discloses it.

1 Q. So as you've applied the term "paramagnetic
2 material" in claim 14, what do you understand that term to
3 mean?

4 A. I think the description that I quote on page 163
5 is as good as any. It reduces the reluctance of a magnetic
6 circuit and can, therefore, allow a magnetic field to more
7 efficiently perform more work.

8 Q. Is that a definition of a paramagnetic material or
9 is that just describing --

10 A. No.

11 Q. -- what effect the paramagnetic materials can
12 have?

13 A. That was the effect. That's why Dong literally
14 discloses a parametric material, and Ogusu discloses an
15 equivalent, a mixture of materials that has the same
16 effect.

17 Q. So setting aside for a moment the mixture of
18 ferromagnetic and nonmagnetic materials. What's the
19 difference between a ferromagnetic material and a
20 paramagnetic material?

21 A. I can only give you the big picture. I'm not a
22 chemist.

23 But my understanding is that in a ferromagnetic
24 material, when the electrons are disturbed by a magnetic
25 field, they will maintain that disturbance, and in a

1 paramagnetic material, there are free electrons that could
2 be temporarily disturbed by a magnetic field, but they
3 don't retain that disturbance property.

4 Again, I tend to treat them operationally, that
5 paramagnetic materials are used in the industry to provide
6 reduced reluctance -- I'm sorry, reduced -- yeah, reduced
7 reluctance.

8 Q. So would another way of saying what you just said
9 a minute ago concerning the difference between
10 paramagnetism and ferromagnetism be that in a paramagnetic
11 material, the induced magnetic field is at all times
12 proportional to the applied magnetic field, but in a
13 ferromagnetic material, there is hysteresis in the
14 relationship between the applied and induced field?

15 ATTORNEY MARANDO: Objection. Form.

16 THE WITNESS: I don't think that's quite right,
17 because I don't think that, in practice, it's actually
18 proportional. I think there are all kinds of
19 nonlinearities. But I do think -- again, we primarily use
20 them, from my perspective, as a reduced reluctance to
21 increase the magnetic flux, but I do believe that when you
22 compare the ferromagnetic materials, ferromagnetic
23 materials do have magnetic hysteresis, and paramagnetic
24 materials do not have a significant amount.

25 BY ATTORNEY RUBIN:

1 Q. Do you know whether a non-ferromagnetic material
2 mixed with a ferromagnetic powder, like what's described in
3 Ogusu, would have hysteresis between the applied and
4 induced magnetic field?

5 A. It may have some, but my understanding from Ogusu
6 is that it still accomplishes the function of having a
7 reduced reluctance path for increased magnetic flux flow --
8 flux.

9 Q. But Ogusu says that that function can also be
10 achieved by using a pure ferromagnetic material, right?

11 (Clarification by the certified stenographer.)

12 THE WITNESS: No. I don't think you get the
13 reduced flux from the -- from the ferromagnetic material.
14 I just think that Ogusu talks about two different
15 embodiments: One that has improved flux and one that does
16 not.

17 BY ATTORNEY RUBIN:

18 Q. Are you saying that Ogusu says that the embodiment
19 with the yoke made of the mixture has improved flux and the
20 embodiment with just the ferromagnetic material does not?

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: It's not completely clear to me
23 whether or not those statements apply to both.

24 BY ATTORNEY RUBIN:

25 Q. So in paragraph 28, Ogusu talks about the mixture.

1 So the last sentence of that paragraph says, quote, in
2 addition to a ferromagnetic metal, it is also possible to
3 use various nonmagnetic materials mixed with ferromagnetic
4 powders as the material of the above magnetic body.

5 And that's from paragraph 28 of Exhibit 115, the
6 translation of Ogusu.

7 You see that?

8 (Clarification by the certified stenographer.)

9 THE WITNESS: Yes.

10 BY ATTORNEY RUBIN:

11 Q. So the paragraph says you can use ferromagnetic
12 metal or it's also possible to use a mixture --

13 A. Right.

14 Q. -- for the yoke.

15 A. Right. And it further, later in 47, talks about
16 wanting to have a high flux efficiency. So that's part of
17 what would motivate you to use the materials that are truly
18 parametric that are described in Dong to achieve that high
19 magnetic efficiency.

20 Q. Now, paragraph 47 says, since each yoke forms the
21 magnetic loop having the shortest path, that doesn't seem
22 to be distinguishing between different types of yokes or
23 different yokes made of different materials, does it?

24 A. No.

25 ATTORNEY MARANDO: Objection.

1 THE WITNESS: But, again, in a combination, it
2 would be clear that if the nonmagnetic material were the
3 material from Dong, that would improve the efficiency which
4 is the stated goal in Ogusu.

5 BY ATTORNEY RUBIN:

6 Q. I'm sorry. You said the nonmagnetic material from
7 Dong?

8 A. The non-ferromagnetic materials can be the para --
9 the tungsten from Dong which would reduce the reluctance of
10 the magnetic circuit and increase the magnetic efficiency
11 as Ogusu explains is advantageous.

12 Q. So when Ogusu talks about a mixture, it says --
13 and this is reading from paragraph 28 -- quote, nonmagnetic
14 materials mixed with ferromagnetic powders.

15 So you'd agree that nonmagnetic materials can't be
16 referring to a paramedic -- paramagnetic material like
17 tungsten, right?

18 A. I read that as referring to a non-ferromagnetic
19 material.

20 Q. I see.

21 So you think that paramagnetic materials are
22 nonmagnetic as the term is used in Ogusu?

23 (Clarification by the certified stenographer.)

24 ATTORNEY MARANDO: Objection. Form.

25 THE WITNESS: No. No. I -- I read Ogusu as

1 referring to materials that could be mixed with the
2 ferromagnetic materials to produce a magnet.

3 BY ATTORNEY RUBIN:

4 Q. When Ogusu talks about a nonmagnetic material,
5 would you agree that it's talking about a material where
6 applying an external magnetic field does not induce a
7 magnetic field within the material?

8 A. It could be. I read it more broadly as something
9 that's simply not a ferromagnetic material. It's not going
10 to have an induced field in the way that the ferromagnetic
11 material would.

12 Q. Okay. So turning back to your declaration,
13 specifically to paragraph 277 of your 992 declaration. You
14 refer to a POSITA understanding that you could add a
15 paramagnetic material such as tungsten to Fukumoto's
16 vibration module.

17 Do you see that?

18 A. Yes.

19 Q. So looking at Fukumoto -- see if I can load that
20 in the chat function, too.

21 Okay. So on the screen I've got Exhibit 1105,
22 which in each of the two IPRs is the Fukumoto prior
23 reference.

24 And so if we're talking about modifying figure 3
25 of Fukumoto based on Dong by adding a paramagnetic material

1 such as tungsten, where do you believe a POSITA would add
2 tungsten or another paramagnetic material in figure 3?

3 A. It can go anywhere in the flux path, but I think
4 in the obvious one -- the most obvious one, in light of the
5 other teachings, would be on the top and bottom of the --
6 of the floating magnet. Top and bottom surfaces.

7 Q. So when you say on the top and bottom surfaces,
8 the entire top and entire bottom surfaces of the floating
9 magnet 122?

10 A. That would make sense. That corresponds to what I
11 showed in the modified figure 24B on page 161 of my
12 declaration.

13 (Clarification by the certified stenographer.)

14 ATTORNEY RUBIN: I just uploaded Exhibit 1011.

15 (Clarification by the certified stenographer.)

16 ATTORNEY RUBIN: It is.

17 (Exhibit 1011 was presented and subsequently
18 marked for identification.)

19 BY ATTORNEY RUBIN:

20 Q. So Exhibit 1011, in each of the two IPRs is an
21 English translation of a Chinese patent application to
22 Dong, et al.

23 Would you agree that in -- withdrawn.

24 So in your description of Dong in your
25 declaration, you refer to figure 6 and 7 of Dong.

1 Do you recall that?

2 A. Yes.

3 Q. And in figure 6 and 7 of Dong, which you should
4 see on the screen, where is the tungsten?

5 A. The entirety of the counterweight was made of
6 tungsten. Let me look and see if I can remember which is
7 the counterweight in those figures.

8 15. Yeah. So element 15 in figure 6 is made of
9 tungsten.

10 Q. So in figure 6 of -- withdrawn.

11 And then where is the tungsten in figure 7 of
12 Dong?

13 A. I don't think it's labeled, but it would be that
14 same element 15 that -- it's illustrated in the same way.

15 Q. With the hatching from --

16 (Clarification by the certified stenographer.)

17 BY ATTORNEY RUBIN:

18 Q. -- with the hatching using diagonal lines from the
19 upper left to lower right?

20 A. You know, I think it's the entirety of that
21 object. The rectangle with the two ends sticking out is
22 15.

23 Q. So are the portions of that object labeled 17
24 and 18 also --

25 (Clarification by the certified stenographer.)

1 BY ATTORNEY RUBIN:

2 Q. Are the portions of that object labeled 17 and 18
3 also part of the tungsten counterweight?

4 A. I'm sorry. It is only the outside portion
5 that's 15. So that's what's tungsten, is the outside
6 portion. And it would be the same outside portion in
7 figure 7.

8 Q. So in Dong, the paramagnetic material is not
9 located on the tops and bottoms of the weight but on the --
10 or the left and right ends?

11 A. Yes. And the same thing could be done in the
12 combination. Again, it can go anywhere in the flux path.

13 Q. Now, turning back to Fukumoto figure 3 in the
14 combination that you described with Ogusu. Where do you
15 believe that a person skilled in the art would place the
16 ferromagnetic material or the mixture of nonmagnetic and
17 ferromagnetic materials from Ogusu?

18 A. Well, again, it can go anywhere in the flux path.
19 That's really the teaching on Dong and the knowledge of a
20 person of ordinary skill in the art. But it can go on --
21 it would go on the surface of that element 122, and it
22 could either go on the left and right sides or it can go on
23 the top and bottom or both.

24 Q. Does it make any difference whether you put it on
25 left and right or top and bottom in terms of the effect on

1 reluctance?

2 A. Either one would improve the reluctance. Would --
3 would improve the efficiency. But one may do so more than
4 the other. You would have to do an actual analysis based
5 on the shapes probably with a finite element analysis to
6 figure out the absolute best, but either one would
7 accomplish the claim.

8 Q. So you understand the term "power supply" in the
9 context of the challenge patents here. What is a power
10 supply?

11 A. I think, in this case, it's the -- it's anything
12 that supplies power to the coils.

13 Q. So as you are applying the term "power supply,"
14 does the power supply need to, in any way, change a voltage
15 or current or frequency from that of an inputted electrical
16 power?

17 ATTORNEY MARANDO: Objection. Form.

18 THE WITNESS: It wasn't something I had to
19 consider for my application of the claims. As I look at
20 the language, I haven't really considered it. Clearly, in
21 the patent and in the art, the control component is
22 controlling the supply of power from the power supply. So
23 that's what I looked for.

24 In the embodiments that are disclosed, it does
25 that by communicating directly with the power supply. So I

1 think certainly under 112, 6, that would be required if --
2 if the control component is a 112, 6, component or its
3 equivalent.

4 BY ATTORNEY RUBIN:

5 Q. Turning to page 190 -- I'm sorry -- 186, you say
6 that POSITA would have recognized that Ogusu uses an
7 H-bridge switch or other equivalent structure to convert
8 power supply from a battery in Ogusu to the selected
9 waveform.

10 Do you see that?

11 A. Yes.

12 Q. So are you saying here that an AC current can be
13 generated from an H-bridge switch acting directly on the
14 voltage supply by a battery?

15 A. I missed a word there.

16 Q. So can an AC waveform be generated using an
17 H-bridge switch directly from the voltage supplied by a
18 battery?

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: In the way we would normally
21 describe an AC voltage, a bidirectional voltage that
22 switches back and forth in direction can be generated by an
23 H-bridge directly from a battery.

24 BY ATTORNEY RUBIN:

25 Q. Would the magnitude of the AC voltage outputted by

1 the H-bridge be the same as the magnitude of the voltage
2 that was output by the battery?

3 A. No. There are always losses, but sometimes they
4 can be minimized.

5 Q. Starting on -- in paragraph 304 of your 992
6 declaration, you talked about a combination of Ogusu with
7 Fukumoto.

8 Do you see that?

9 A. Yes.

10 Q. Earlier, we talked about modifying Fukumoto based
11 on Ogusu. And here you're talking about a combination of
12 Ogusu with Fukumoto.

13 A. Yes.

14 Q. And, earlier, I asked you some questions about the
15 geometry of the combination where Fukumoto is modified
16 based on Ogusu.

17 You remember that?

18 A. Yes.

19 Q. Would the geometry that you get from combining
20 Ogusu with Fukumoto as you described in Ground 2A be the
21 same as the geometry that you believe the POSITA would
22 obtain by modifying Fukumoto based on Ogusu?

23 A. I think a range of geometry is obvious for either
24 case, and that range wouldn't be any different. But one
25 might start with Ogusu's geometry, if one started with

1 Ogusu as the reference, and end up with something that
2 looks more like Ogusu as being more obvious, not that
3 that's a legal standard.

4 Q. And the combination that you think the POSITA
5 would reach based on Ogusu with Fukumoto, which you
6 described in Ground 2A, is that combination a pager? Is it
7 a PDA? Is it something different?

8 ATTORNEY MARANDO: Objection. Form.

9 THE WITNESS: It's a -- a linear vibrational
10 resonator would be suitable for use in a PDA or a phone or
11 a pager. There's a long history of the same types of
12 vibration devices being used in all three of those.

13 BY ATTORNEY RUBIN:

14 Q. Well, one of the claims you contend is obvious
15 under Ground 2A is claim 1 which requires user input
16 features.

17 The actual vibration actuator in Ogusu doesn't
18 have user input features, does it?

19 A. So the claimed element doesn't have to have user
20 input. It has to respond to user input. I guess it has
21 user input features. I would read the ordinary meaning of
22 that to be reasonably broad. But, in any case, Ogusu talks
23 about its use in a pager, and every pager that I ever saw
24 had user input capability.

25 Q. So when you say that you read user input features

1 to be rather broad, do you understand user input features
2 to include things that not themselves have buttons or touch
3 screens or other sensors to receive the user input?

4 A. Those are certainly the things that I identified
5 in the prior art, but I think it's probably broad enough to
6 incorporate any mechanism for the module to receive user
7 input.

8 Q. So let's say in the context of a personal
9 computer. I take it that you would agree that a keyboard
10 or a mouse would meet the term "user input features"?

11 ATTORNEY MARANDO: Objection. Form.

12 THE WITNESS: Yeah. In the abstract, without
13 looking at the function, I would consider a keyboard or a
14 mouse to be a user input feature.

15 BY ATTORNEY RUBIN:

16 Q. How about a USB port? Would you consider that to
17 be a user input feature as the term is used in the claims
18 as you've applied them?

19 ATTORNEY MARANDO: Objection. Form.

20 THE WITNESS: Not necessarily. Lots of devices
21 that have USB ports that are not used for user input.

22 BY ATTORNEY RUBIN:

23 Q. Suppose I have a desktop computer that was sold
24 with a -- that contains USB ports and was sold with a USB
25 keyboard and USB mouse. Are the USB ports on that computer

1 user input features?

2 ATTORNEY MARANDO: Objection. Form.

3 THE WITNESS: I hadn't thought about it. I didn't

4 have to define it that precisely in order to apply the

5 prior art because the prior art has buttons and touch

6 screens.

7 Q. Okay. So the user input features in the prior art

8 that's used in this combination for Ground 2A would be the

9 buttons and touch screens?

10 A. Yes.

11 Q. So the combination of Ogusu with Fukumoto in your

12 opinion would satisfy claim 1 would have to include either

13 a button or a touch screen from one of the prior art

14 references.

15 Would you agree with that?

16 (Clarification by the certified stenographer.)

17 ATTORNEY MARANDO: Objection. Form.

18 THE WITNESS: Or some other equivalent. Right?

19 Fukumoto discloses the touch screen and the buttons. Ogusu

20 discloses that users can select things on the device. So

21 presumably it has either buttons or some similar user input

22 control. It would certainly be obvious to do so.

23 ATTORNEY RUBIN: Take a break?

24 (Clarification by the certified stenographer.)

25 ATTORNEY MARANDO: Sure.

1 (Time noted 1:49 p.m. PDT.)

2 (Recess taken.)

3 (Time noted 2:07 p.m. PDT.)

4 BY ATTORNEY RUBIN:

5 Q. So I'd like to turn in your '992 declaration to
6 page 168.

7 A. You mean '993?

8 Q. Well, I was saying in the '992.

9 A. Okay. Sorry. Misheard. Okay.

10 Q. So on -- in paragraph 290, you offer some opinions
11 that the Masahiko reference qualifies as prior art for
12 claim 16 because of the priority date that claim 16 is
13 entitled to.

14 Do you see that?

15 A. Yes. I could not find any support for the
16 multiple oscillation frequencies combined in the 2009 or
17 2010 files.

18 Q. So claim 16 in each of the challenged patents
19 depends from claim 15 --

20 (Clarification by the certified stenographer.)

21 (Time noted 2:09 p.m. PDT.)

22 (Discussion held off the record.)

23 (Time noted 2:09 p.m. PDT.)

24 BY ATTORNEY RUBIN:

25 Q. So you would agree that claim 16 in each of the

1 challenged patents is dependent on claim 15 in each of the
2 challenged patents?

3 A. Yes.

4 Q. And claim 15 requires that the control component
5 drive simultaneous oscillation of the movable component at
6 two or more frequencies to generate complex vibration
7 modes.

8 A. Yes.

9 Q. So you don't offer any opinion that claim 15 is
10 not supported by the earlier application filings before
11 January 6th, 2012, do you?

12 ATTORNEY MARANDO: Objection. Form.

13 THE WITNESS: I don't think I opined on that one
14 way or the other as best as I can recall. It probably does
15 not. But I don't remember giving an opinion one way or the
16 other.

17 BY ATTORNEY RUBIN:

18 Q. I'm sorry. When you say it probably does not,
19 what do you mean?

20 A. I don't recall any support for claim 15 in the
21 earlier filings, but I don't think I did that specific
22 analysis.

23 Certainly isn't supported in the 2009 provisional.
24 I don't recall it being supported in the 2010 parent
25 either.

1 Q. Is that something you analyzed, whether claim 15
2 was supported by the 2010 parent application?

3 (Clarification by the certified stenographer.)

4 THE WITNESS: I don't recall specifically doing
5 that analysis. But figures that I would have expected to
6 support that claim were not present in the 2010 file.

7 ATTORNEY RUBIN: So I've just uploaded what's
8 Exhibit 1027 in each of the IPRs.

9 (Clarification by the certified stenographer.)

10 ATTORNEY RUBIN: Not previously discussed today.
11 That's right.

12 (Exhibit 1027 was presented and subsequently
13 marked for identification.)

14 BY ATTORNEY RUBIN:

15 Q. And so Exhibit 1027 is U.S. Patent
16 Number 8,093,767, Pepin, et al.

17 Do you recognize this as the parent application of
18 the two patents that are the subject of these IPRs in that
19 parent application that was filed in 2010?

20 A. Yes.

21 ATTORNEY MARANDO: Objection. Form.

22 THE WITNESS: This was the earlier-filed
23 application 2010 that I was referring to.

24 BY ATTORNEY RUBIN:

25 Q. So turning to column 7, lines 17 through 20 read,

1 quote, more complex vibrational modes may systematically
2 and/or periodically alter the frequency or produce various
3 complex multicomponent vibrational modes useful in certain
4 applications, appliances, devices, and systems.

5 Do you see that?

6 A. Yes.

7 Q. Claim 15 reads, wherein the control component
8 drives simultaneous oscillation of the movable component at
9 two or more frequencies to generate complex vibration
10 modes.

11 Do you have an opinion as to whether the sentence
12 in column 7, lines 17 through 20 of the '676 Patent -- I'm
13 sorry -- the '767 Patent support the limitation added by
14 claim 15?

15 A. In my opinion, it doesn't. And it certainly
16 doesn't clearly disclose possession of the claim or that
17 the inventor possessed the invention of the claim.

18 It talks about "the" frequency in a way that I
19 think a person of ordinary skill would read as one, and it
20 really does not, in any way, clearly disclose two or more
21 frequencies in a single movable component.

22 Q. So --

23 A. It doesn't disclose modulating oscillation
24 frequency at a beat frequency in a aperiodic oscillation
25 waveform.

1 Q. Okay. So what you just pointed to at the end of
2 that answer were limitations in claim 16, correct?

3 A. Right.

4 Q. So is it your testimony that when line 17
5 through 20 on column 7 of the '767 Patent refers to a,
6 quote, multi -- refers to, quote, multicomponent
7 vibrational modes, that those multicomponent vibrational
8 modes can be single frequency?

9 A. I think so. It certainly doesn't disclose
10 simultaneous oscillation at two or more frequencies as the
11 way to get there.

12 Q. So what are these multiple components that have
13 the same frequency as you're interpreting column 7 of
14 the '767 Patent?

15 A. Again, it's the patent's job to be clear about
16 that. It's not. But it could be 100 hertz buzz that is at
17 two different volumes.

18 Q. So is your testimony that when this sentence in
19 the '767 Patent talks about altering the frequency or
20 producing complex multicomponent vibrational modes, that
21 the complex multicomponent vibrational modes referred to
22 only have a single frequency?

23 ATTORNEY MARANDO: Objection. Form.

24 THE WITNESS: There is no disclosure of two or
25 more frequencies in the patent specification itself.

1 BY ATTORNEY RUBIN:

2 Q. You agree there is disclosure of altering the
3 frequency?

4 A. Of altering a single frequency, yes, but not
5 simultaneously having two or more frequencies, which is
6 what claim 15 requires.

7 ATTORNEY RUBIN: I'll pass the witness.

8 ATTORNEY MARANDO: I don't have any questions. So
9 I think we're done. We can go off the record.

10 ATTORNEY RUBIN: All right.

11 CERTIFIED STENOGRAPHER: Chris, please state your
12 transcript order on the record.

13 ATTORNEY MARANDO: Rough and final according to
14 just standard delivery.

15 CERTIFIED STENOGRAPHER: So a copy of the
16 transcript?

17 ATTORNEY MARANDO: Yeah. The transcript. Rough
18 and final.

19 CERTIFIED STENOGRAPHER: Got it. Thank you.

20 (Proceedings concluded at 2:22 p.m. PDT.)

21 ---o0o---

22

23

24

25

1 ---o0o---

2

3 I, ANDREW WOLFE, PH.D., do hereby declare under
4 penalty of perjury that I have read the foregoing
5 deposition; that I have made any corrections as appear
6 noted, in ink, initialed by me, or attached hereto; that my
7 testimony as contained herein, as corrected, is true and
8 correct.

9 EXECUTED on this _____ day of _____,
10 2024, at _____, _____.

11

12

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ANDREW WOLFE, PH.D.

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1 CERTIFICATE OF REPORTER

---o0o---

2 I, the undersigned, a Certified Shorthand

3 Reporter, Licensed by the State of California, being

4 empowered to administer oaths and affirmations remotely

5 pursuant to Section 2093(b) of the Code of Civil Procedure,

6 do hereby certify:

7 That the foregoing proceedings were taken remotely

8 before me at the time and place herein set forth; that any

9 witness in the foregoing proceedings, prior to testifying,

10 were placed under oath; that a verbatim record of the

11 proceedings was made by me using machine shorthand which

12 was thereafter transcribed under my direction; further,

13 that the foregoing is an accurate transcription thereof.

14 I further certify that I am neither financially

15 interested in the action nor a relative or employee of any

16 attorney or any of the parties.

17 Further, that if the foregoing pertains to the

18 original transcript of a deposition in a Federal Case,

19 before completion of the proceedings, review of the

20 transcript [] was [] was not requested.

21 IN WITNESS WHEREOF, I have this date subscribed my

22 name.

23 DATED: 4/3/2024

24

25 _____
JULIE RUMSEY, CSR No. 14144

1 Errata Sheet

2

3 NAME OF CASE: SAMSUNG ELECTRONICS vs RESONANT SYSTEMS

4 DATE OF DEPOSITION: 03/28/2024

5 NAME OF WITNESS: Andrew Wolfe, Ph.D.

6 Reason Codes:

7 1. To clarify the record.

8 2. To conform to the facts.

9 3. To correct transcription errors.

10 Page _____ Line _____ Reason _____

11 From _____ to _____

12 Page _____ Line _____ Reason _____

13 From _____ to _____

14 Page _____ Line _____ Reason _____

15 From _____ to _____

16 Page _____ Line _____ Reason _____

17 From _____ to _____

18 Page _____ Line _____ Reason _____

19 From _____ to _____

20 Page _____ Line _____ Reason _____

21 From _____ to _____

22 Page _____ Line _____ Reason _____

23 From _____ to _____

24

25 _____

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.

Petitioners,

v.

RESONANT SYSTEMS, INC.,

Patent Owner.

Case IPR2023-00992

Case IPR2023-00993

Patent 9,369,081

Patent 9,941,830

**ERRATA TO THE DEPOSITION OF
ANDREW WOLFE (MARCH 28, 2024)**

I, ANDREW WOLFE, have read the transcript of my deposition taken on March 28, 2024. Changes to the transcript that I wish to make and the reasons for making them are listed below.

Page:Line	Now Reads	Should Read	Reason for Change
10:4-5	"I have the two <u>challenge</u> patents and certain pieces of prior art."	"I have the two <u>challenged</u> patents and certain pieces of prior art."	Transcription error
13:22-24	"They're based on the same art because the claims slightly differ. The explanations slightly differ as well."	"They're based on the same art. Because the claims slightly differ, the explanations slightly differ as well."	Transcription error
14:15-16	"There is the same number of grounds in each of the two <u>declaration</u> , yes."	"There is the same number of grounds in each of the two <u>declarations</u> , yes."	Transcription error
21:12-13	" <u>Some point</u> for somebody to be able to make an infringement determination..."	" <u>At some point</u> for somebody to be able to make an infringement determination..."	Transcription error
25:14-18	"Buttons are one of the things that are disclosed. And, yes, <u>anybody else that</u> discloses other normal touch screen things like dragging an icon in figure 38 and 39, and slider control for adjusting the quantity in figure 41."	"Buttons are one of the things that are disclosed. And, yes, <u>Fukumoto</u> discloses other normal touch screen things like dragging an icon in figure 38 and 39, and slider control for adjusting the quantity in figure 41."	Clarification

Page:Line	Now Reads	Should Read	Reason for Change
32:24-25	"You could use an <u>analogue digital converter.</u> "	"You could use an <u>analog to digital converter.</u> "	Transcription error
33:16-17	"to run <u>somewhere near a device</u> "	"to run <u>some device</u> "	Transcription error
35:7-11	"And, therefore, a person of ordinary skill would have understood that the capability is there to use either one or more oscillators to do complex things, and it's a simple design choice as to whether you combine the two signals or whether you drive them <u>to</u> separate oscillators."	"And, therefore, a person of ordinary skill would have understood that the capability is there to use either one or more oscillators to do complex things, and it's a simple design choice as to whether you combine the two signals or whether you drive them <u>through</u> separate oscillators."	Transcription error
36:8	"as you <u>said, it</u> is not true"	"as you <u>said it, it</u> is not true"	Transcription error
48:10-15	"I mean, the whole point of 82 and 83 really is to illustrate that this is a simple design choice <u>to as to</u> whether or not to put all the energy in <u>from side</u> or all the energy in for -- or half the energy from each side, and that there are some advantages to doing it from both sides because of the increased stability."	"I mean, the whole point of 82 and 83 really is to illustrate that this is a simple design choice <u>as to</u> whether or not to put all the energy in <u>from each side</u> or all the energy in for -- or half the energy from each side, and that there are some advantages to doing it from both sides because of the increased stability."	Transcription error

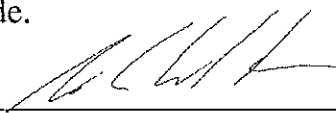
Page:Line	Now Reads	Should Read	Reason for Change
50:7-10	“Again, I think the first motivation is probably the stronger one, that you want to distribute the forces and not have the entirety of the forces be <u>distributed</u> the spring.”	“Again, I think the first motivation is probably the stronger one, that you want to distribute the forces and not have the entirety of the forces be <u>distributed by one</u> spring.”	Transcription error
62:1-3	“But there's no <u>limitation or teaching</u> <u>that</u> it would be longer than it is wide.”	“But there's no <u>limitation or teaching</u> <u>away that</u> it would be longer than it is wide.”	Transcription error
68:23-24	“when it crosses some <u>threshold of zero</u> ”	“when it crosses some <u>threshold or zero</u> ”	Transcription error
69:24-25	“Fujimoto [sic]”	“Fukumoto”	Clarification
70:20	“person of ordinary skills”	“person of ordinary skill's”	Transcription error
72:15-17	“No. I'm simply saying one motivation to do this might be that one could implement the magnets with a <u>smaller size in the spring.</u> ”	“No. I'm simply saying one motivation to do this might be that one could implement the magnets with a <u>smaller size than the spring.</u> ”	Transcription error
72:25	“Fujimoto [sic]”	“Fukumoto”	Clarification
76:24-25	“ <u>I think neither</u> of the secondary references discloses it.”	“ <u>I think either</u> of the secondary references discloses it.”	Transcription error
80:16-19	“So that's part of what would motivate you to use the materials that are truly <u>parametric</u> that	“So that's part of what would motivate you to use the materials that are truly <u>paramagnetic</u>	Transcription error

Page:Line	Now Reads	Should Read	Reason for Change
	are described in Dong to achieve that high magnetic efficiency.”	that are described in Dong to achieve that high magnetic efficiency.”	
90:20-21	“Not necessarily. Lots of <u>devices that have USB</u> ports that are not used for user input.”	“Not necessarily. Lots of <u>devices have USB</u> ports that are not used for user input.”	Transcription error
95:23-25	“It doesn’t disclose modulating oscillation frequency at a beat frequency <u>in</u> a <u>aperiodic</u> oscillation waveform.”	“It doesn’t disclose modulating oscillation frequency at a beat frequency <u>and an</u> aperiodic oscillation waveform.”	Transcription error

I hereby certify that the transcript of my deposition taken on March 28, 2024, as corrected above, is a true and accurate transcription of my testimony.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: 4/9/24



 Andrew Wolfe

