

SEL EXHIBIT 2012

INNOLUX CORPORATION v. PATENT OF SEMICONDUCTOR ENERGY
LABORATORY CO., LTD.

IPR2013-00068

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

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Petitioner,

vs.)No. IPR2013-00066
)Patent 7,876,413

PATENT OF SEMICONDUCTOR)
ENERGY LABORATORY CO., LTD.,)
Patent Owner.)

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14 VIDEOTAPED DEPOSITION OF MILTIADIS HATALIS, PH.D.
15 Irvine, California
16 Monday, July 1, 2013
17 Volume I

21 Reported by:
22 DENISE BARDSLEY
23 CSR No. 11241
24 Job No. 1684547
25 PAGES 1 - 197

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

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 INNOLUX CORPORATION,)
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 Petitioner,)
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 vs.) No. IPR2013-00066
) Patent 7,876,413
 PATENT OF SEMICONDUCTOR)
 ENERGY LABORATORY CO., LTD.,)
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 Patent Owner.)
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Videotaped deposition of MILTIADIS HATALIS,
PH.D., Volume I, taken on behalf of Patent Owner, at
3 Park Plaza, Suite 1100, Irvine, California,
beginning at 9:02 a.m. and ending at 6:32 p.m. on
Monday, July 1, 2013, before DENISE BARDSLEY,
Certified Shorthand Reporter No. 11241.

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EXAMINATION

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WITNESS
MILTIADIS HATALIS, PH.D.
VOLUME I

BY MR. MANZO

8

EXHIBITS

EXHIBIT	DESCRIPTION	PAGE
Exhibit 2008	Display Research Laboratory website material	22
Exhibit 2009	Fig. 1B, Prior Art	82
Exhibit 2010	Fig. 2C, Prior Art	101

1 Irvine, California, Monday, July 1, 2013

2 9:02 a.m.

3
4 THE VIDEOGRAPHER: Good morning.

5 We are on the record at 9:02 a.m. on July
6 1st, 2013. This is the video-recorded deposition of
7 Dr. Milt Hatalis. My name is Scott Slater, here
8 with our court reporter, Denise Bardsley. We are
9 here from Veritext Legal Solutions at the request of
10 the patent owner.

11 This deposition is being held at 3 Park
12 Plaza, Suite 1100, in the city of Irvine, California
13 92614. The caption of this case is Innolux
14 Corporation versus Patent of Semiconductor
15 Laboratory Co., Ltd., Case No. IPR2013-00066, Patent
16 7,876,413.

17 Please note that audio and video recording
18 will take place unless all parties agree to go off
19 the record.

20 Microphones are sensitive and may pick up
21 whispers, private conversations or cellular
22 interference.

23 I am not authorized to administer an oath,
24 I am not related to any party in this action, nor am
25 I financially interested in the outcome in any way.

1 May I please have an agreement from all
2 parties that we may proceed.

3 MR. MANZO: Agreed.

4 MR. GIBSON: That's fine with me.

5 THE VIDEOGRAPHER: Thank you very much.

6 At this time will counsel and all present
7 please identify themselves for the record.

8 MR. MANZO: For the plaintiff -- sorry.

9 For the patent owner, my name is Edward
10 Manzo, M-a-n-z-o.

11 With me are Mark Murphy and Stanley
12 Schlitter.

13 Mr. Murphy and I are from the firm of Husch
14 Blackwell, LLP in Chicago. Mr. Schlitter is from
15 Steptoe & Johnson.

16 MR. GIBSON: Stan Gibson on behalf of the
17 petitioner.

18 THE VIDEOGRAPHER: Thank you very much.

19 Will the court reporter please administer
20 the oath.

21 //

22 //

23

24

25

1 MILTIADIS HATALIS, PH.D.,
2 having been administered an oath, was examined and
3 testified as follows:
4

5 EXAMINATION

6 BY MR. MANZO:

7 Q Good morning, Professor. My name is Edward
8 Manzo, and I'm here on behalf of SEL to ask you some
9 questions about topics that are raised in your
10 declaration and otherwise.

11 A Good morning.

12 Q Could you please state your name.

13 A Miltiadis Hatalis.

14 Q And do you live in Pennsylvania somewhere?

15 A In Bethlehem, Pennsylvania.

16 Q Thank you.

17 How old are you, Doctor?

18 A 54.

19 Q I'm going to hand you what's been
20 previously filed as Exhibit 1005. It purports to be
21 the declaration of Miltiadis Hatalis.

22 Could you just take a quick look at that
23 and tell me if that is the declaration that you
24 signed?

25 A Yes, it is.

1 Q Thank you.

2 How did you prepare for today's deposition?

3 A I reviewed the petition, I reviewed my
4 declaration, I reviewed the board decision, I
5 reviewed the rehearing request by the patent owner,
6 and I reviewed the decision of the board from the
7 rehearing, and I also reviewed the initial response
8 of the patent owner.

9 Q Did you look at the challenged patent?

10 A Yes. I also looked at the '413, and I look
11 at the two prior art patents, namely the one from
12 Sukegawa and Nakamoto.

13 Q For convenience, why don't we refer to
14 those that way.

15 We'll call Exhibit 1003, which is U.S.
16 Patent 5,636,329 the Sukegawa patent.

17 Is that okay with you?

18 A It will be fine.

19 Q And we'll call the Japanese reference to
20 Nakamoto, N-a-k-a-m-o-t-o, and that was filed as
21 Exhibit 1004, we'll call that Nakamoto.

22 Is that all right with you?

23 A That will be fine.

24 Q Okay. Thank you.

25 Did you meet with anybody in preparation

1 for today's deposition?

2 A Yes. I met with my counsel, Stan Gibson,
3 and his colleague, Ali Shalchi.

4 Q About how long did you meet?

5 A I arrived in the area Wednesday night, so
6 we met the last four days.

7 Q Professor, do you know how you came to be
8 hired or why you were hired for this expert
9 engagement?

10 A I am a professor in the field of
11 microelectronics and, in particular, my group and my
12 Ph.D. thesis is advancing the technology of
13 thin-film transistors, which is the main electronic
14 device used in flat panel displays and, in
15 particular, the active metrics liquid crystal
16 displays. I'm director of a laboratory which I have
17 founded in the early '90s at Lehigh, which is called
18 the Display Research Laboratory, and I have
19 published extensively in this field, both in
20 scientific journals and in conference proceedings.

21 I also published two book chapters, so I
22 consider myself to be expert in this field.

23 Q Have you actually worked in the
24 microelectronics field producing any products,
25 commercial products?

1 A I have been in academia and I have worked
2 with companies as a consultant, but the academic
3 institution that I have been as a student or, for
4 the last 25 years, as professor is a nonprofit
5 institution so we do research. We do not produce
6 and sell commercial product.

7 But we produce prototype displays and
8 produce processes, device structures, materials that
9 different companies may adopt in their manufacturing
10 process for making displays.

11 Q Can you tell me the difference between a
12 process engineer and a circuit design engineer with
13 respect to the semiconductor field?

14 A A process engineer and a circuit design
15 engineer -- a process engineer deals more with the
16 actual fabrication, so it deals with the different
17 processes that are used to deposit material, to lay
18 down materials, to remove materials, to clean
19 substrates, to do a process known as a
20 photolithographic process, which defines the areas
21 that will remain on the substrate during an etching
22 process. So it's involved with all the different
23 fabrication steps that are used to implement the
24 design into a physical product.

25 Whereas a design engineer, he deals with

1 the abstract elements. He deals with device models,
2 and he does not fabricate the components, but he is
3 designing them using different softwares to find out
4 what would be the electrical performance of a system
5 before it gets fabricated so it can do changes in
6 the design, say the width or the length or the line,
7 in order to determine whether the different electro
8 characteristics, such as resistance or capacitance,
9 will affect the performance and whether the system
10 specification at the end will be the desired ones.

11 Q Do those persons have different backgrounds
12 and skill sets?

13 A The circuit design and process engineers,
14 well, they start from -- if you start from the
15 field, say, of electrical engineering, the
16 background education is going to be the same.

17 For example, our electrical engineer
18 students take courses in circuit design, they also
19 take courses in microelectronic technology, so they
20 are exposed to the whole spectrum of what it takes
21 to design a system as well as to fabricate the
22 system.

23 Now, once such engineer goes into a
24 company, the specific tasks that I will be assigned,
25 they will probably be one or the other. But if he

1 change positions and if his education has been good,
2 he could move from processing to circuit design and
3 from circuit design to processing.

4 But after a while, I would think that some
5 people will tend to become known as -- for one
6 aspect and they maybe enjoy doing more circuit
7 design and enjoy doing more process engineer. But
8 it is not one unique answer. It depends on the
9 interest of the people and the opportunity they have
10 in life and so on.

11 Q Thank you.

12 Would you consider yourself closer to a
13 circuit designer or a process engineer?

14 A Well, I am a professor, so -- and I teach
15 courses related to circuit design. For example, I
16 teach the course on very large-scale integration,
17 VLSI. That course deals with the design of circuits
18 that go into electronic systems, but I also have a
19 laboratory that we do actual fabrications and deal
20 with materials and processes, so I am, by virtue of
21 my position, exposed to both.

22 Q I see.

23 Do you teach any courses in process
24 engineering for semiconductors?

25 A I have taught a course, "Microelectronic

1 Technology," and I taught it several times when I
2 was first started as a professor. Right now I'm
3 teaching a course in VLSI design, and as a part of
4 that course there is a section that deals with the
5 fabrication.

6 Q I see.

7 Now, I see from an attachment to your
8 exhibit -- sorry -- your Appendix A on Exhibit 1005,
9 right after page 51, that you've been involved in
10 some patent litigation cases starting in 2001; is
11 that right?

12 A That's correct.

13 Q And it looks like in 2001 you were hired to
14 be a witness or an expert for Sanyo against SEL; is
15 that right?

16 A Correct. I think it was SEL against Sanyo.
17 I am not an expert who is against who. I
18 represented Sanyo.

19 Q And you were an expert for CMO in 2007
20 against SEL?

21 A Correct.

22 Q And you were an expert in 2008 for CMO?

23 A Correct.

24 Q And you were an expert against SEL in a
25 case SEL versus Samsung in 2009?

1 A Correct.

2 Q And then you were an expert for CMI in
3 2011?

4 A Yes.

5 Q And you continued as an expert in 2011 for
6 Samsung? Yes?

7 A Correct, yes.

8 Q So, in a nutshell, for 12 years,
9 approximately, you have been an expert witness for
10 companies opposing SEL; is that right?

11 MR. GIBSON: Objection; form.

12 THE WITNESS: The record shows -- this is
13 what the record shows, but I do not choose the
14 cases. The different law firms come and hire me.

15 BY MR. MANZO:

16 Q What is your relationship with CMO?

17 MR. GIBSON: Objection; form.

18 THE WITNESS: I have been hired by several
19 law firms to serve as an expert on behalf of the
20 defendants, which happened to be CMO or CMI. And I
21 did not deal with CMO directly, I dealt with the law
22 firms.

23 BY MR. MANZO:

24 Q Has your experting work in patent
25 litigation always been against the patent owner?

1 A So far. The recent -- a new case I have
2 been asked and I have been retained in which it will
3 start, if it doesn't settle earlier, later this
4 year, and in that case I will represent the patent
5 owner.

6 Q But otherwise not?

7 A So far, no.

8 Q You have a relationship with the Display
9 Research Laboratory that I think you mentioned a
10 moment ago; is that correct?

11 A I am a director of the laboratory.

12 Q Who funds the laboratory?

13 A Well, the physical infrastructure, the
14 construction of the laboratory, the utilities for
15 the laboratory, that is funded by the university.
16 The university also pays for my nine-month salary.

17 I am responsible for raising the funds to
18 cover the actual expenses of consumables and for the
19 salary and tuition of the graduate students that
20 work in the laboratory, as well as for the staff
21 engineer that works in the laboratory.

22 Q Where does the capital equipment come from?

23 A The capital equipment comes from a variety
24 of sources. Some of it are been donated by
25 industry, some of it would come -- we buy from

1 special equipment grants that we get from their
2 regular solicitations from the government, different
3 agencies, or we buy them from the budget of specific
4 research program. If, during the research for that
5 program, we need a particular piece of equipment, we
6 budget that equipment in that -- in the proposal.

7 Q Please tell me whether you have had any
8 kind of economic support or the Display Research
9 Laboratory has had any support or donations from any
10 of the following entities.

11 Acer?

12 A No.

13 Q ViewSonic?

14 A No.

15 Q Vizio?

16 A No.

17 Q Westinghouse?

18 A No.

19 Q Innolux?

20 A No.

21 Q CMI?

22 A No.

23 Q CMO?

24 A No.

25 Q Professor, without asking you specific

1 dollar numbers, what portion of your personal income
2 comes from expert work for law firms, as opposed to
3 your compensation from the university for teaching?
4 And, again, I don't want any dollar numbers, just a
5 percentage.

6 A Well, that percentage, it varies from year
7 to year, and it -- and, as you see, my litigation or
8 patent involvement work or consulting has been
9 sporadic.

10 So if you are talking about a particular
11 year or you are talking about since 2001?

12 Q Well, let's start with 2013, year to date.

13 A The contribution of the patent litigation
14 is significant.

15 Q More than 50 percent?

16 A Up to now?

17 Q Yes.

18 A It may. I didn't do the calculation. I
19 have to do the calculation.

20 But this is an unusual year, because the --
21 some of the legal fees -- some of the work that I've
22 done in 2012 were paid in 2013, so it's always a
23 period before you send in an invoice and you get
24 paid. So in 2013, it reflects work that was done in
25 2012.

1 Q Thank you.

2 What would you say -- between 2001, between
3 the interval of 2001 through 2013, what would you
4 say is the highest percentage in a single year that
5 was represented by compensation for working as an
6 expert witness?

7 So I'm asking you for a percentage number
8 and a year in round numbers.

9 A Of the total income earned that year or --

10 Q Yes.

11 A -- compared to my academic year salary?

12 Q Total income earned.

13 A The highest amount total income earned in
14 any year since 2011 --

15 Q 2001.

16 A Sorry. 2001.

17 Q I'm only asking for percentage, not
18 dollars, again.

19 A Right, but I haven't done the calculation.
20 That's many tax years I have to try to go back and
21 try to do it.

22 But in round numbers, I don't know, I
23 cannot give you the exact number, but I would say 30
24 to 40 percent may have been the highest.

25 Q Have you been an expert in other

1 litigations besides patent cases?

2 A Expert to law firms?

3 Q Law firms or others.

4 A I have been an expert and I have a section
5 in my resume that I built, consultant to industry
6 since 1997, so I list a number of companies where I
7 serve as a technical consultant.

8 Q What page is that on?

9 A Page 1 of my vitae -- actually, page 51 of
10 Exhibit 1005.

11 Q I see that you list a number of companies.
12 Have you been an expert witness for any of those
13 companies in litigations?

14 A You compare this list to the list that I
15 list in my litigations, you see that none of them
16 have been involved in litigation.

17 Q Professor, the listing in section V is
18 confined to patent cases, and my question is not
19 confined to patent cases.

20 So there are many other kinds of cases
21 besides patents.

22 A You're talking about in general legal?

23 Q Yes.

24 A No.

25 Q Okay.

1 A My only consulting to companies related to
2 legal matters has been the litigation cases that I
3 list in page 2 of my resume or page 52 of 1005,
4 which was accurate as of the writing of that time.
5 It excludes the present case.

6 Q Have you had any direct discussions with
7 CMO, CMI, Innolux, Acer, ViewSonic, Vizio,
8 Westinghouse about this case?

9 A About this case? No.

10 Q And when I say "this case," I mean these
11 proceedings at the patent office, as well as the
12 district court litigation.

13 A Again, related to this case, no.

14 Q I'm going to show you several pages, but
15 before I mark, I just wanted to know if these are
16 all related to one another. If they are, I'm going
17 to mark them as a single exhibit.

18 I'll staple them together if they are from
19 a single place.

20 A These are pages from our laboratory Web
21 page.

22 MR. MANZO: Okay. Let me make that a
23 single exhibit, which I'll staple together, as
24 Exhibit 2008.

25 MR. MURPHY: You said 2008?

1 MR. MANZO: Yes. I believe that's the next
2 number.

3 (Deposition Exhibit 2008 was marked
4 for identification by the court
5 reporter and is attached hereto.)

6 BY MR. MANZO:

7 Q So your answer is that Exhibit 2008 comes
8 from the website for the Display Research Lab; is
9 that correct?

10 A Yes, it appears so.

11 Q And that's a picture of you on the very
12 first page at the top, correct?

13 A From a long time ago.

14 Q It looks much the same.

15 A Thank you.

16 Q And these next two pictures of doctoral
17 candidates of yours -- or, sorry.

18 The first one is a doctoral candidate and
19 the next one is a master's candidate; is that right?

20 A Our website is a bit outdated. The master
21 student is also a doctoral candidate right now, and
22 there is another student that has been hired, and
23 there is a post doc also.

24 Q Look at the last sheet, please. There are
25 some wave forms.

1 Do you see that?

2 A These are IV characteristics. We call them
3 IV characteristics.

4 Q Okay. I just wanted to identify the page.
5 And then I want to actually look at the page right
6 before that one, the one that starts out,
7 "Polysilicon TFT on Steel."

8 Do you see that?

9 A Yes.

10 Q Professor, the first drawing there is a
11 sectional representation; is that right?

12 A It is a cross section, a representation,
13 correct.

14 Q And the top layer is labeled as "Metal-1";
15 is that right?

16 A That's correct.

17 Q It sits on top of passivation oxide?

18 A That is correct.

19 Q And I see that there is a transistor shown;
20 is that right?

21 A That is correct.

22 Q The transistor has source and drain
23 regions; is that right?

24 A That is correct.

25 Q How is metal-1 connected, if at all, to the

1 source or drain regions?

2 A Well, in this particular device structure,
3 after we form the source drain and gate regions of
4 the transistor, the whole device is -- structure is
5 covered by an oxide, which is labeled as passivation
6 oxide.

7 Then there is a lithographic step that is
8 define contact holes, followed by an etching step
9 that opens and removes -- open the contact holes and
10 removes the passivation oxide above the source and
11 drain regions.

12 Then there is a deposition step that lays
13 down the metal-1 throughout the substrate, followed
14 by a lithographic step that defines the regions
15 where the metal remains.

16 And upon completion of the etching step, we
17 form what's known as a source and drain electrode.
18 This is the metal-1 regions that are attaching the
19 source and drain regions of the device.

20 Q So does the metal-1 extend through the
21 opening, the contact hole that you talked about, to
22 reach the source and to reach the drain region?

23 MR. GIBSON: Objection; form.

24 THE WITNESS: The metal-1 conformily coats
25 the walls of the holes and the bottom of the contact

1 hole and establish a region between the two vertical
2 walls of the opening where the metal-1 and the
3 source or the drain is in direct contact.

4 BY MR. MANZO:

5 Q Does metal-1 contact the source region or
6 the drain region through the contact hole?

7 A The metal goes down the metal hole and
8 makes a contact to the source and drain region.

9 Q Is that referred to as contact through a
10 contact hole in the semiconductor industry,
11 Professor?

12 MR. GIBSON: Objection; form.

13 MR. MANZO: Strike that.

14 Q Is that type of contact referred to as
15 contact through an opening or through a contact hole
16 in the semiconductor industry?

17 MR. GIBSON: Objection; form.

18 THE WITNESS: There are many ways to
19 express an opening in a contact hole, and sometimes
20 we call contact hole, sometimes we call them
21 opening, sometimes we call them via. The contact is
22 considered many different ways. Through hole is one
23 way to accurately depict whether you have the hole
24 open directly above -- the hole has been open
25 through the layer that is deposited in between the

1 two layers that you want to make a contact.

2 So in the cases where you have an
3 intermediate insulating layer and you need to open a
4 contact hole or the via or form some sort of an
5 opening in the insulating layer, then the metal goes
6 and covers conformily the hole. It has to cover
7 conformily the edges of the hole, otherwise there
8 will be a discontinuity. And even though you may
9 have a metal on top of the passivation and you have
10 a metal in the bottom of the opening, it is not
11 covering the walls of the hole, you will not be able
12 to maintain electro continuity of the metal.

13 BY MR. MANZO:

14 Q When you use the word "conform," what do
15 you mean?

16 A That there is -- as illustrated here in the
17 schematic, that the metal coats the wall of the hole
18 or the opening, so then there is a continuity of the
19 metal from the upper surface of the oxide to the
20 bottom of the opening.

21 Q In your interactions with people, namely,
22 engineers and the like, during your consulting with
23 any of the companies you listed on page 51 of your
24 declaration, namely, IBM, Kodak, et cetera, did you
25 ever discuss circuit design with the people there?

1 A Yes, we did.

2 Q So is there a shorthand way in the
3 semiconductor industry that you are aware of for
4 this type of contact in a semiconductor circuit?

5 A Well, when we are talking about a device
6 structure, and there are many different ways to
7 fabricate a device structure, we always list the
8 sequence of the layers. We describe the device
9 structure and we list the materials and we list the
10 order with which the materials are laid down. And
11 we have a very specific description of the device
12 structure of how it is made and what is -- in what
13 order the different steps are performed and what
14 order the different layers and materials are put
15 down.

16 So within that context, words that you
17 mentioned, like through hole, get a specific meaning
18 and been understood by the experts in the field what
19 they mean or ordinary skilled in the art of what
20 they mean.

21 Q So if one of your students working in the
22 Display Research Laboratory or an engineer at one of
23 these companies with whom you've consulted use the
24 phrase "contact through an opening in an insulation
25 layer," would you understand what they were talking

1 about?

2 A If they give me the structures -- and even
3 in this particular device structure that you're
4 referring here, we have two different -- actually,
5 we have more than one metal layer. What is shown in
6 this particular structure is something called
7 metal-1.

8 In our design we have another layer which
9 we call it metal-0. And the metal-0 goes directly
10 on top of the gate, and then there is a passivation
11 oxide on top of it.

12 So in that case when we opening the contact
13 holes, we can reveal that layer, namely, the metal-0
14 below the passivation oxide.

15 So when we're referring to a structure, it
16 is helpful to understand the sequence of the layers
17 put down so we can understand what we mean by the
18 word.

19 Q Okay. Well, taking this structure in this
20 figure in this Exhibit 2008, which is before you,
21 does metal-1 contact the source region through the
22 contact hole?

23 A The metal-1 contacts the source through
24 hole.

25 Q And metal-1 also contacts the drain region

1 through a different contact hole; is that right?

2 A Metal-1 is making contact through hole to
3 drain.

4 Q How do people skilled in the art refer to
5 those holes? What words do they use? I think you
6 mentioned a few. You said "hole" or "through hole"
7 and "via"; is that right?

8 A The openings can be called vias, it can be
9 called contacts, it can be contact holes, it can be
10 called cuts.

11 Q Cut?

12 A Cut.

13 For example, in our process, the metal-1
14 goes to the edge of the substrate and then it is
15 covered by another passivation layer, so that
16 passivation layer is covering the metal-1 completely
17 and we cannot make electrical contact because it is
18 protected by another passivation layer.

19 And we defined regions on top of those
20 metal regions which we call those metal regions
21 pads -- p-a-d-s, pads. And we're removing the
22 second passivation oxide from those pads -- from
23 above the pads, and we call that glass cut. Glass
24 is the name for the final passivation layer.

25 So the meaning or the name of those holes,

1 there are several.

2 Q I see. You said "glass cut," if I'm not
3 mistaken?

4 A That's how we call it, yes.

5 Q Good.

6 A That's the name of the mask layer we use to
7 define those openings.

8 Q How many people work at the digital
9 research laboratory?

10 A You mean the Display Research Laboratory?

11 Q I apologize. You're right. I do mean the
12 Display Research Laboratory.

13 A How many people work as of now or --

14 Q Yes.

15 A -- how many people went through and
16 completed their degrees through their Ph.D.s?

17 Q Let's say today. I mean, currently. I
18 don't mean today, July 1, but these days.

19 A My group, as I mentioned, right now
20 consists of three graduate students, two
21 undergraduate students, one post doc and one
22 research engineer. They spent intermediate times
23 through the laboratory.

24 Q I'm sorry. I lost you. You said one
25 research what?

1 A Engineer.

2 Q Okay.

3 A He is a lab manager who takes care of some
4 of the processing equipment and performs some of the
5 processing steps in the more sophisticated equipment
6 in the lab.

7 Q Does the Display Research Laboratory
8 conduct research for industry -- strike that.

9 Does the research laboratory receive
10 assignments from industry and execute research in
11 response to those assignments?

12 A We receive funding from industry. Some of
13 the funding comes in the form of sponsor research
14 programs. The sponsor research programs include
15 what you refer to as assignments, but it is not
16 specific assignments. As we define the research
17 area and whether that would be some new material or
18 some new device structures, and we investigate that
19 area.

20 And in other times we receive funding in
21 the forms of research gifts, which are money that we
22 receive, but that don't have a specific deliverable
23 assigned to it.

24 Q Professor, you have many published papers,
25 yes?

1 A I have a number of it.

2 Q More than a hundred journal papers and
3 conference papers?

4 A I think it is more than 150, but, yeah.

5 Q Okay.

6 A But it's not a world record.

7 Q Understood.

8 How about patents, do you have any patents
9 in your name?

10 A Yes, I have a patent that was issued this
11 spring.

12 Q What is it about?

13 A It is about a way to drive a new type of
14 active metrics display called active metrics organic
15 light-emitting diode displays.

16 Q AMOLED?

17 A Correct.

18 Q You're the -- are you the sole inventor?

19 A One of my -- a former graduate student of
20 mine are co-inventories. His name is first.

21 Q Is your name in there?

22 A Yes.

23 Q Okay. Who is the owner of that patent?

24 A Lehigh University.

25 Q Will you share in any royalties that that

1 patent may receive?

2 MR. GIBSON: Objection; form.

3 THE WITNESS: Yes.

4 BY MR. MANZO:

5 Q To rephrase, if Lehigh University grants
6 any license or collects revenue as a result of that
7 patent, will you participate monetarily?

8 A I think I answered yes.

9 Q Okay. Are there any other patents that are
10 pending or for which -- or which have issued for
11 which you are the named inventor or a named
12 inventor? And I just mean yes or no.

13 A I'm trying to recollect. I work with a
14 former graduate student of mine who is currently a
15 professor in Taiwan, and he had filed for some
16 patents some time ago, and he had named me
17 co-inventor. I don't know whether those patents
18 have been issued or not, so there may be other
19 patents that I've been named as co-inventor, but
20 those may be Taiwanese patents, but I don't have a
21 good record of those ones.

22 So either the work at Lehigh, the one that
23 has been issued recently is the only one.

24 We have filed some invention disclosures
25 previously that are -- well, IP office has a very

1 limited budget, and we went through a lot of changes
2 over the years. So we're not as efficient in
3 protecting our IP as maybe some other schools.

4 Q Have you ever considered the question of
5 whether something -- some development was obvious or
6 nonobvious with regard to the patent law of the
7 United States?

8 A I think these -- all these proceedings deal
9 with this topic that you referred to.

10 Q So you have?

11 A That's correct. And also in my previous
12 litigation case, I also done invalidity expert
13 report where the issue of obviousness is relevant.

14 Q What is your understanding of obviousness
15 in the U.S. patent law as it applies to whatever
16 you've considered?

17 A There's a specific section in my expert
18 report that gives you a more exact definition. Can
19 I refer to that or do you want me to give you --

20 Q Before you refresh your recollection, why
21 don't you give me your best recollection as you sit
22 there?

23 A Because I'm a technical expert, not a legal
24 expert, and I may fail the legal examination, but,
25 in general, my understanding of whether a prior art

1 renders something invalid or obvious is if the
2 elements in the prior art that are disclosed in the
3 patent, which has been questioned, are expressed
4 directly, explicitly, so if the prior art mention
5 those elements that are claimed as inventions in the
6 patent, or the element that existed in the prior art
7 between a specific piece of prior art or through
8 combination of pieces of prior art would render
9 something obvious; in other words, someone with
10 ordinary skill in the art will be able to combine
11 the knowledge and the structures or materials,
12 whatever they may be, in their particular field and
13 create the part which is claimed as an invention.

14 How did I do?

15 Q I just need your understanding, Professor.
16 It's not a legal -- as you said, you're not an
17 expert at the law.

18 Do you distinguish between whether a patent
19 claim having several elements would have been
20 obvious to a person of ordinary skill in the art
21 prospectively as opposed to retrospectively?

22 MR. GIBSON: Objection; form.

23 THE WITNESS: As you said, I'm not a legal
24 expert.

25 Can you elaborate on what you mean by

1 "prospectively as opposed to retrospectively"?

2 BY MR. MANZO:

3 Q Yes.

4 Let me strike that question for the moment.

5 When you were forming your opinion that is
6 reflected in your declaration, Exhibit 1005, you
7 considered various pieces of prior art, correct?

8 A Correct.

9 Q Where did those pieces of prior art come
10 from?

11 A They were provided by the counsel.

12 Q Were any others provided by counsel than
13 the ones shown in this Exhibit 1005?

14 A For each patent there was a folder and
15 there was some piece of prior art that will serve
16 between different patents.

17 I have to refer to my notes. There would
18 be in a handful of patents in this whole list I
19 consider more relevant than the ones that I have
20 listed here from that list, but I am trying to
21 recollect because this was work done back in the
22 fall.

23 Q Let me see if I can help.

24 Is it true that you were given the patent
25 and the claims that you were supposed to consider

1 and a package of prior art to look at? Is that a
2 fair characterization?

3 A Correct.

4 Q All right. So how did you proceed from
5 there?

6 A I was asked to express an opinion on
7 whether the elements in the claims of the '413 are
8 disclosed or are rendered obvious in light of the
9 prior art.

10 Q So you went to the claim, or a claim at
11 issue, and you said this has 13 elements, let's say,
12 and then you asked where can I find element 1, where
13 can I find element 2, et cetera; is that correct?

14 A No it is more involved than that one. I
15 first read several times and tried to understand
16 each patent separately. I spent quite a bit of time
17 trying to understand the specifications and the
18 prior art and the entire patent, whatever it
19 disclosed from the abstract all the way down to the
20 claims. And I tried to formulate an understanding
21 of each patent and for both the -- in this case the
22 '413 as well as the two prior art that are used in
23 my declaration report.

24 Q Okay. So after you read and understood the
25 patents in question, what did you do?

1 A Then I looked for each one of those or the
2 claims or the limitations -- I went and addressed
3 the claims, because not all claims have been --
4 what's the right word?

5 Q Not all claims are challenged?

6 A Not all claims are challenged. A subset of
7 the claims are challenged or are set forward in this
8 proceeding, so I went to this particular claims and
9 I went to all the elements or limitations of each
10 claim and I tried to see if those are disclosed in
11 the prior art or through combination of the prior
12 art they may be obvious to someone skilled in the
13 art at the time of the invention.

14 Q So you used 1997 as the time of the
15 invention?

16 A Correct. Whatever is the -- I don't have
17 the exhibit now, I don't have the exact date,
18 priority dates for each element.

19 Q Okay. You used the priority date as the
20 date for a person of ordinary skill in the art?

21 A Correct.

22 Q What were you doing in the field of
23 semiconductors as of the -- as of 1997?

24 A Myself?

25 Q Yes.

1 A By 1997 I already have been full professor
2 at Lehigh and already have established the
3 research -- the Display Research Laboratory. I was
4 teaching courses and I was conducting research.

5 Q How much interaction did you have with
6 persons of ordinary skill in the semiconductor arts
7 on a day-to-day basis?

8 A There's a list in my resume, I have
9 projects funded by industry and we also serve as a
10 consultant to industry and we also have
11 collaboration with industry, even if they're not --
12 they're not sponsoring our research, many times we
13 do research collaborations.

14 So I had interactions with people. Would
15 that be on a day-to-day basis? Not day-to-day
16 basis, because I was in academia and they were in
17 industry. But when we have review meetings when we
18 are visiting each other, organizations, when we are
19 meeting at our conferences, and I organized several
20 workshops related to the display -- flat panel
21 displays. So in the meetings at Lehigh or in
22 industry or at the technical workshops or
23 conferences.

24 Q "Technical workshops," did you say?

25 A Yes. I listed them in my resume as well.

1 I serve as the organizing chairman of several such
2 workshops. Two of them were held, actually, at
3 Lehigh, one was a couple hundred people show up in
4 each one of them.

5 I had a lot of interaction with people with
6 ordinary skill in the art.

7 Q Let me ask you a few specific questions.
8 Is it your understanding that when a company that is
9 in the business of producing a semiconductor device,
10 a VLSI device, if you will, they generally have lead
11 designers for the new products; is that right?

12 A You mean lead designers?

13 Q Yes. Are you familiar that they have lead
14 designers assigned to certain new projects?

15 A Okay.

16 Q And are you familiar -- are you aware about
17 whether they have group meetings with their teams to
18 discuss progress in the design field and in the
19 process engineering steps?

20 A You have specific projects?

21 Q Yes, specific projects. The next
22 generation of a memory chip, for example, or the
23 next generation of a TFT device or a liquid crystal
24 display device.

25 A I'm familiar with this general processes,

1 but the processes that you're referring most related
2 to a specific product.

3 Q Yes.

4 A And those specific products are typically
5 confidential to the companies. And very few
6 outsiders, only suppliers or key partners, have
7 exact knowledge of what's going on in those
8 meetings.

9 Q Is it fair to say that you have not
10 participated in those group meetings?

11 A For specific products development, no,
12 because I am in the field of -- I'm in research, and
13 so we're always looking at not just the next
14 generation, but we are looking at what will be five
15 or even longer years out in the horizon.

16 And, typically, in that long horizon,
17 research institutions and companies are a little bit
18 more open and we are having like in the context of a
19 conference, when we have a panel discussion and when
20 we have representatives from both industry and
21 academia telling their opinions about the particular
22 issue that has been questioned.

23 So I have participated in many such panel
24 discussions and discussions that are dealing with
25 what will be happen next.

1 For example, you listed in my resume for my
2 website, in my website you refer to this devices
3 that are made on a metal-4 substrate and that's
4 belong to the field of flexible displays.

5 And, as you know, there are no products
6 right now on the flexible displays, but a lot of
7 people worldwide working in the field of flexible
8 displays and we have been pioneers in that field.

9 So in that context, I interact a lot with
10 engineers from companies, as well as scientists from
11 academia and government, and have discussion of what
12 are the issues and what are the problems and what we
13 need to address.

14 MR. MANZO: Why don't we take a very short
15 recess to get some coffee and such.

16 THE VIDEOGRAPHER: Off the record. We are
17 off the record. The time is 10:11 a.m.

18 (Recess.)

19 THE VIDEOGRAPHER: We are back on the
20 record the time is 10:23 a.m.

21 BY MR. MANZO:

22 Q Professor, referring to your declaration,
23 1005, apart from the appendices, it has 50 pages,
24 right?

25 A That's correct.

1 Q So my question relates to how this document
2 was prepared. Let's start out with who typed it.
3 Do you know?

4 A I type and other people contribute to the
5 typing.

6 Q About how much of it did you type yourself?
7 10 percent, 25 percent, 75 percent, what?

8 A You like to talking about percentage,
9 but --

10 Q Well, a lot, a little, most of it?

11 A This is my declaration. I took sections or
12 guidance or input from other people in legal
13 matters, because I'm not aware of these proceedings.
14 These are actually pretty new proceedings. I've
15 never been involved in inter partes review before.

16 I was given a general format, but I would
17 not try to say that this is someone else piece of
18 work. This is my piece of work.

19 Q How long did it take to produce Exhibit
20 1005?

21 A I've been involved in preparing five
22 declarations for the five patents that I have been
23 involved. I think we started in October, if I'm not
24 mistaken, and then the last one was filed, I think,
25 in early December.

1 So in that time frame there were five
2 declarations that were prepared. I don't remember
3 how many days or exact weeks, but you can take the
4 average and you can see how much time was spent
5 roughly.

6 Q Did you look at drafts and make markups and
7 return them to somebody else?

8 A I was, for example, provided with a vitae
9 that the counsel was -- pulled from a previous
10 report of mine, and I said, "That's not the right
11 one, that's not updated," so I had to fix that part.

12 But there was a lot of things discussed in
13 these proceedings, and these are my opinions, these
14 are my report.

15 Q About how many revisions did the document
16 go through, this particular Exhibit 1005, how many
17 iterations?

18 A There were five -- five reports. I don't
19 remember how many revisions each one of them had.

20 Q Okay. Fair enough.

21 And you said these were prepared over the
22 course of about two to three months; is that right?

23 A That's my recollection.

24 Q Professor, I'm handing you what Innolux
25 submitted as Exhibit 1001, which is the

1 '413 patent at issue in this proceeding.

2 Do you recognize it?

3 A Yes, I do.

4 Q Could you please turn to the claims, and
5 particularly claim 1, which you will find at the
6 last part of column 14.

7 Do you see that?

8 A Yes, I do.

9 Q Why don't you take a moment to reread claim
10 1 to yourself, please.

11 Have you read through claim 1?

12 A Yes.

13 Did you also give me that one?

14 Q I'm handing you now a copy of the petition
15 submitted by Innolux in this matter entitled,
16 "Petition for Inter Partes Review of U.S. patent No.
17 7,876,413," et cetera.

18 Do you have that?

19 A Yes.

20 Q And if you look at that, you'll see that
21 Innolux has reproduced the claims and given the
22 separate paragraphs a numbering system.

23 For example, claim 1, appearing at pages 16
24 through 23, is broken into different rows, and the
25 rows are numbered.

1 Do you see that?

2 A The claims?

3 Q Yes, at claim 1, it starts with 1.1, "A
4 liquid crystal displays device comprising," and then
5 1.2 is the next row, and it's, "A first wiring over
6 a substrate."

7 So do you see the numbering system?

8 A Yes.

9 Q Okay. Good.

10 Because I'm going to refer to those
11 numberings, if I may.

12 So I'll -- claim element 1.2 on page 17
13 recites, "A first wiring over a substrate" --

14 A Excuse me. You mean on page 16 and 17?

15 Q Yes.

16 A Are these the claims charged for APA in
17 view of Sukegawa?

18 Q Well, I'm not referring to the right-hand
19 column --

20 A Okay.

21 Q -- only the left-hand column, which is the
22 claim knowledge.

23 A Okay. All right.

24 Q And, theoretically, the two different claim
25 charts should have the claim reproduced the same

1 way, don't you agree?

2 A On the left-hand side, yes. The right-hand
3 side would be different.

4 Q So claim element 1.2 is for a first wiring
5 over a substrate?

6 A Correct.

7 Q Now, in the context of this patent which
8 you've studied, does the substrate have to exist
9 before the first wiring is placed over it?

10 A Of course.

11 Q Okay. In section 1.3 it calls for a first
12 insulating film over the first wiring. In the
13 context of this patent, does the first wiring have
14 to exist before the first insulating film becomes
15 over it?

16 A Assuming that there are no other layers
17 that are formed after the first wiring, then --
18 well, strike that one.

19 Q I'm only asking you if one is preexisting,
20 that's all.

21 A Let me see your question.

22 Q Let me restate the question for you. My
23 question really relates to the sequence, Professor.

24 A Okay.

25 Q Does the first wiring have to exist before

1 the first insulating film in this claim element 1.3
2 in the context of this patent?

3 A It says the first insulating film over the
4 first wiring, so that implies that the first wiring
5 comes first and the first insulating film comes
6 afterward.

7 Q Okay. Moving on to the next claim element,
8 1.4, is it also true that the substrate and first
9 insulating film have to exist before the second
10 wiring is placed over them?

11 A Yes.

12 Q Looking at claim element 1.5, does the
13 second wiring have to exist before the second
14 insulating film is placed over it or somehow
15 provided over it?

16 MR. GIBSON: Objection; form.

17 THE WITNESS: The second wiring has to
18 exist before the second insulating film comes over
19 it.

20 BY MR. MANZO:

21 Q In 1.6, does the second wiring have to
22 exist before the transparent conductive layer is
23 provided over it?

24 MR. GIBSON: Objection; form.

25 BY MR. MANZO:

1 Q Let me restate.

2 Is there an implied sequence in section
3 1.6 -- or claim element 1.6?

4 A What do you mean by "implied sequence"?

5 Q Must one of these two things come before
6 the other? Namely, one of them being a transparent
7 conductive film, the other one being the second
8 wiring.

9 A Well, in this 1.6, as well as in many of
10 the previous ones, we describe and we refer to two
11 elements. And if you're referring to the sequence
12 with the specific reference to those two elements,
13 then an implied sequence exists, but only which
14 refers -- to elements that are referred. There may
15 be other elements that may exist and they may be
16 laid down before the second piece is laid down.

17 So referring to a sequence -- referring to
18 certain sections, and these sections refer to its
19 contained two elements. And the language that
20 exists in each section implies a sequence, but the
21 sequence, as far as to those two elements, in
22 particular. There may be other elements that may
23 exist and --

24 Q Yes, I understand. I'm not asking about --
25 I'm not asking whether there are any intervening

1 steps. I'm just asking about is there one before
2 the other.

3 So would you say about 1.6 that there is
4 one before the other?

5 MR. GIBSON: Objection; form.

6 THE WITNESS: The first region of the --
7 the second wiring, it comes first, but before the
8 transparent conductive layer comes down, there may
9 be other layers that are laid down and then the
10 transparent conductive layer comes down. Or -- and
11 so in this case we are referring to the sequence of
12 those two elements and we forget all the other ones.

13 So you're asking me about if the first --
14 if the second wiring comes before the transparent
15 conductive layer, the answer is yes. But whether
16 the transparent conductive layer touches the second
17 wiring, comes immediately after the second wiring or
18 there are other layers in between, that will
19 determined by, perhaps, the other claims, the other
20 limitations within the claim.

21 BY MR. MANZO:

22 Q Okay. Thank you.

23 Let's look at 1.7, which is for, quote, a
24 flexible printed circuit over the first wiring and
25 the first region of the second wiring, semicolon,

1 and closed quote.

2 Is there an implied sequence of anything
3 coming ahead of the others in that section 1.7 of
4 the claim?

5 A That the flexible printed circuit comes
6 last, and that it is -- and before you put down the
7 flexible printed circuit, you already have put down
8 the first wiring and the second wiring.

9 Q Okay. And in 1.8, which reads, quote, a
10 sealant over the first wiring and a second region of
11 the second wiring, closed quote.

12 Is there any implied sequence there,
13 Professor?

14 A That the sealant comes last, after you put
15 down the first wiring and the second wiring.

16 Q Okay. Thank you.

17 Can you skip down to page 21 of the
18 petition and look at element 1.11.

19 I'll read it into the record. "Wherein the
20 first wiring and the second wiring are in electrical
21 contact through an opening in the first insulating
22 film."

23 Did I read it correctly?

24 A Yes.

25 Q Okay. Does that provision or that recital,

1 element 1.11, call for the first insulating film to
2 exist before the contact is made?

3 A This particular section taken out of the
4 context of the previous sections that we referred to
5 or in light of the previous section that we referred
6 to?

7 Q In light of the entire claim and the
8 patent, please.

9 A In light of the sections that we have just
10 read, there is an implied order that we have just
11 discussed. And that order dictates that you first
12 have the first wiring, then you have the first
13 insulating film, and then you put down the second
14 wiring.

15 In that sequence, the first insulating film
16 has been placed in between the first wiring and the
17 second wiring, so that is what is implied by the
18 previous sections that you have just read.

19 Q Is that how a person ordinarily skilled in
20 the art in 1997 would have understood these words in
21 this patent if it had existed in 1997, in your
22 opinion?

23 A As I said earlier in the discussions, in
24 the morning before the break, the exact sequence of
25 the order of the layers that are laid down is

1 important for someone to understand the structure
2 that is described.

3 And I gave you the example that in our
4 laboratory you have two different metals, metal-1
5 and metal-0. The metal-1 comes on top of an
6 insulating layer, the passivation oxide, or the
7 metal-0 comes -- touches with the gate electrode and
8 then the passivation oxide goes on top of it.

9 So an implied order of things cannot be
10 taken in absence of more detailed description of the
11 structure.

12 Q I'm confused. Are you saying, Professor,
13 that a person in 1997 who is ordinarily skilled in
14 the art would not have understood this claim element
15 the way you just described it or would have? It has
16 to be one or the other.

17 A Understood what?

18 Q The meaning of 1.11.

19 A I think the meaning of 1.11 is one thing
20 and the thing you are asking about, the sequence,
21 the implied sequence of layers, and that's a
22 different thing.

23 Q Okay.

24 A Did I understand your previous question and
25 your last question? I think you asked me first

1 about the sequence and now you're asking about the
2 meaning.

3 Q Fair enough. I was not trying to separate
4 them. I was trying to ask you that when you
5 explained the sequence that you found in 1.11,
6 whether somebody ordinarily skilled in the art in
7 1997 would share the same view with you. It is not
8 a trick question.

9 A No, I understand you're not asking trick
10 questions, but I'm asking whether 1.11 by itself
11 describes a sequence, and my answer is 1.11 by
12 itself does not describe an explicit sequence. The
13 previous sections that refer to, those describe a
14 specific sequence.

15 The meaning of 1.11 is that the first
16 wiring and the second wiring are in contact and that
17 they are in electrical contact, that the exact
18 sequence of the three layers, namely, the first
19 wiring, second wiring and first insulating film, is
20 not implied by 1.11 alone.

21 Q Understood. We want to understand the
22 claim in the context of the other parts of the
23 claim.

24 Now, in the context of the entire claim,
25 what is the meaning of electrical contact through an

1 opening in the first insulating film as it appears
2 in 1.11?

3 A Well, in the context of the entire claim
4 and in the sequence that is described in detail by
5 the earlier sections of claim 1, the meaning of the
6 electrical contact through an opening in the first
7 insulating film in this particular limitation is
8 referred to that the electrical contact will occur
9 because of the opening in the first insulating film.

10 The two layers are separated by an
11 insulating film. And in order to have an electrical
12 contact between them, one has to first open an
13 opening in the first insulating film.

14 Q I understand. Thank you.

15 I want to ask you, finally, about the final
16 claim element, which you'll find on page 22, namely,
17 claim element 1.13, which states, quote, wherein the
18 second wiring and the transparent conductive layer
19 are in direct contact through an opening in the
20 second insulating film, closed quote.

21 Do you see that?

22 A I see that.

23 Q And just for completeness, why don't you
24 read to yourself the element between the, namely,
25 1.12 so that we don't skip anything.

1 Tell me when you're finished reading that.
2 And after you've read that, I'll ask my question.

3 A Go ahead.

4 Q Okay. So my question is: Does section
5 1.13 require the second insulating film to exist
6 before the second wiring and the transparent
7 conductive layer are in direct contact through an
8 opening in the second insulating film?

9 A Can you explain your question?

10 Q Yes.

11 I'm asking whether there is an implied
12 sequence in 1.13 in the context of the whole claim.

13 A A sequence between which layers?

14 Q Well, it's a broad question. Any sequence
15 at all.

16 A Well, if we look at 1.13, there are four
17 elements that are included -- the second wiring, the
18 transparent conductive layer, an opening and the
19 second insulating film.

20 If you're asking me if there is a
21 prescribed sequence, that prescribed sequence is not
22 clear by 1.13 alone.

23 Q What about 1.13 in context of the other
24 claim elements of claim 1?

25 A Okay. 1.13, as in 1.11, the statement not

1 prescribe the specific sequence.

2 In the case of 1.11, we look at the
3 previous limitation stated in the claim, and we
4 identify a prescribed sequence.

5 If we look at the element of the
6 limitations that are disclosed before 1.13, someone
7 skilled in the art will understand there is no
8 prescribed sequence, other than saying that the --
9 that both the transparent conductive layer and the
10 second insulating film are both over the second
11 wiring, but it does not prescribe a sequence which
12 is right above, which one is in direct contact and
13 which is above the other.

14 If nothing else, the language in 1.13 is
15 slightly different than 1.11. In 1.11, in light of
16 the previous layers, previous limitations, it was
17 evident that the first wiring and the second wiring
18 are not in electrical contact, because there is the
19 first insulating film in between that it was
20 explicitly stated by referring to the earlier
21 limitations. So an electrical contact in the
22 context of 1.11 is enabled by the opening.

23 1.13 is referred to direct contact, and
24 direct contact may imply that the transparent
25 conductive layer is for right on top of the second

1 wiring, and then the second insulating film is on
2 top of the transparent conductive layer. So even
3 though there are the second wiring, the transparent
4 conductive layer in direct contact, that direct
5 contact is revealed when we form the opening.

6 That direct contact appears when the
7 opening is formed and the direct contact exists
8 between the vertical walls of the opening.

9 Q So is it fair to say that -- let me ask
10 about the contrapositive.

11 Is that a word that you're familiar with?

12 A No.

13 Q Okay. Is it correct to say that without
14 the opening that's referred to in 1.13, there is no
15 direct contact of the second wiring and the
16 transparent conductive layer -- question mark?

17 MR. GIBSON: Objection; form.

18 THE WITNESS: I do not agree with your
19 statement. A direct contact may exist before the
20 opening that the claim requires also other -- the
21 claim requires other things.

22 For example, it requires the flexible
23 printed circuit to be in direct -- to be in
24 electrical contact through the transparent
25 conductive layer to the second wiring, that's 1.12.

1 So if you have a second insulating film on
2 top of the transparent conductive layer, an opening
3 is required for that electrical connection between
4 the flexible printed circuit and the second wiring.

5 BY MR. MANZO:

6 Q And without such an opening, what happens?

7 MR. GIBSON: Objection; form.

8 THE WITNESS: What happens with respect to
9 what?

10 BY MR. MANZO:

11 Q With respect to the direct contact.

12 A There are three layers -- the second
13 wiring, the transparent conductive layer and the
14 second insulating film. There are two ways those
15 layers can be put down, since we know already that
16 both the transparent conductive layer and the second
17 insulating film are over the second wiring.

18 So there is enough information in the claim
19 to someone skilled in the art to understand that the
20 second wiring comes first.

21 And then the other two layers, the
22 transparent conductive layer and the second
23 insulating film, follow, but there's no implied
24 order or there's not enough information for someone
25 skilled in the art to see that an order, a specific

1 order, is required.

2 So someone skilled in the art will then
3 create the sequence in one of two possible ways.
4 Either you put down the transparent conductive layer
5 on top of the second wiring first and then put the
6 second insulating film as the final layer, or you
7 put the second -- you put the second insulating film
8 first on top of the second wiring in direct contact
9 with the second wiring, and then you will put down
10 the transparent conductive layer on top of the
11 second insulating film.

12 Q Don't you need to have the opening?

13 MR. GIBSON: Objection; form.

14 THE WITNESS: In the first sequence I
15 described an option where the transparent conductive
16 layer is on top of the second wiring and in direct
17 contact with it, and then you put down the second
18 insulating film.

19 The second wiring and the transparent
20 conductive layer, already in direct contact,
21 wherever those two layers start, because they may
22 have different extent as there for preparation for
23 informationary process.

24 In that case, they are in direct contact,
25 and the opening serves to expose the direct contact.

1 BY MR. MANZO:

2 Q You're saying that in option A there
3 already was direct contact between the transparent
4 conductive layer and the second wiring, and the
5 opening exposes that contact; is that what you said?

6 A Correct. Between the vertical walls of the
7 opening we will see the two layers being in direct
8 contact.

9 Q Is the specific order as between -- strike
10 that.

11 Do the other elements of claim 1 give us
12 the specific order that must follow with respect to
13 options A and options B?

14 A In this limitation 1.13, in contrast to the
15 previous limitation that we were discussing, 1.11,
16 there is not enough information -- sorry.

17 The language -- strike.

18 The language used is broad enough that it
19 covers both options.

20 Q But, if I may suggest that you look at 1.5,
21 and doesn't 1.5 tell you that there is second
22 insulating film over the second wiring, and section
23 1.6 says, "and then there is transparent conductive
24 layer over a first region of that second wiring."

25 Doesn't that rule out option A?

1 A No, because the language here is broad. It
2 states that both are over the second wiring, but
3 does not -- do not prescribe or do not require a
4 specific sequence.

5 Q Okay. Let me ask you another question.
6 What words would you or a person of
7 ordinary skill in the art in 1997 use to describe
8 that the contact between the transparent conductive
9 film and the second wiring occurs because of the
10 opening in the second insulating film?

11 MR. GIBSON: Objection; forms.

12 BY MR. MANZO:

13 Q Professor, I may have said "transparent
14 conductive film" when I meant "transparent
15 conductive layer."

16 So can you accept my question with that
17 modification?

18 A Yes.

19 Q Thank you.

20 A Your question stated that the contact is
21 because of the opening. The claim requires through
22 an opening. So your question construe that word
23 "through" in a specific way, and that way is not
24 supported by the information of the limitations, at
25 least what is in the claim 1.

1 MR. MANZO: Okay.

2 THE VIDEOGRAPHER: We're going off the
3 record. We are off the record, the time is
4 a.m. on July 1st, 2013. This is the end of video
5 number 1 of the continuing deposition of Dr. Milt
6 Hatalis.

7 (Recess.)

8 THE VIDEOGRAPHER: We are on the record.
9 The time is 11:27 a.m. on July 1st, 2013. This is
10 the beginning of video number 2 of the deposition of
11 Dr. Milt Hatalis.

12 BY MR. MANZO:

13 Q Professor, before the changeover, we were
14 discussing section 1.16 of claim 1 of the '413
15 patent. And I think you have indicated that it's
16 your opinion that there's -- from the wording of the
17 claim, two different possibilities exist as to the
18 connection between the second wiring and the
19 transparent conductive layer.

20 Is that a fair characterization of what
21 you've said?

22 A That in light of the language of the claim
23 in the earlier part of the claim, the order with
24 which the transparent conductive layer and the
25 second insulating film are deposited over the second

1 wiring is broad, so the exact order can be one of
2 two different ways. And depending upon which way
3 they word "through" may construe a different way.

4 Q I understand. And how would a person of
5 ordinary skill in the art have understood this
6 phrase about direct contact through an opening in
7 the second insulating film in the context of the
8 entire claim and the patent in 1997? So I'm asking
9 you specifically about the opening part of this
10 claim language.

11 A You asked me to construe the word "through"
12 or you asked me to construe the word "opening"?

13 Q I'm not asking you to construe. I'm asking
14 you how a person in the ordinary skill of the art
15 would understand this claim element in light of the
16 entire patent and the claim as a whole with regard
17 to the recital "direct contact through an opening in
18 the second insulating film."

19 A In light of the entire claim, it will mean
20 that in order to create the system -- and the
21 ultimate goal here is to create an electrical
22 contact to the flexible printed circuit. And
23 because there are many conductive layers and many
24 insulating films put down, that openings are
25 required.

1 And, in particular, 1.13 means that through
2 the opening, a contact -- through the opening the
3 second wiring and the transparent conductive layer
4 are in direct contact.

5 So another layer, in this case the flexible
6 printed circuit board, can come down and make
7 electrical connection to them.

8 Q Now, when you just used the word "through,"
9 did you mean through in the sense of "via" or
10 "vee-a"?

11 A The word "through" can be construed in a
12 number of different ways, and via is one such way,
13 which means by means of. But "through" could also
14 mean between, it also means what you mentioned
15 earlier, because of.

16 The language is broad enough that all these
17 meanings are valid meanings to the word "through."

18 Q Professor, have you ever heard anybody in
19 the semiconductor arts use the word "through a
20 contact opening," and mean through as anything other
21 than via or because of, somebody who is actually
22 skilled in the semiconductor arts?

23 MR. GIBSON: Objection; form.

24 THE WITNESS: Excuse me?

25 I'm not receiving the transcript.

1 Thank you.

2 The meaning of the word "through" is
3 because of -- or via is determined whether the
4 sequence of layers, of all the layers, all
5 conductive layers and all insulating layers, that
6 exist in the structure will be such that will
7 support because of.

8 And that was the case for 1.11 where the
9 order of the first wiring and the second wiring and
10 the first insulating film were such, and that order
11 was specifically stated that you have first the
12 first wiring, then the first insulating film and
13 lastly you had the second wiring.

14 So in that context, the word "through"
15 means because of, that in the context of 1.13, or in
16 general, because you refer to semiconductor art in
17 general, in the absence of specific description of
18 the structure and specific sequence of the orders
19 that come down, the word "through" may mean more
20 than one thing, because the contact -- sorry --
21 because the two layers may touch each other, but
22 they are covered by an insulating film, they are not
23 exposed. And if another electrical connection is
24 required, that opening is the one that will -- that
25 will break wire to make that other connection, in

1 this case to the flexible imprinted circuit board.

2 BY MR. MANZO:

3 Q I understand what you're saying, Professor,
4 but my question was how a person skilled in the art
5 would understand the word "through" in this phrase,
6 in this claim with regard to direct contact through
7 the second insulating film.

8 And, if you remember, I asked you if you
9 ever heard anybody use it in the way that you've
10 just described.

11 MR. GIBSON: Objection; form.

12 BY MR. MANZO:

13 Q So my question, Professor, is have you
14 heard somebody ordinarily skilled in the
15 semiconductor fabrication art use the word "through"
16 in the phrase "contact through an opening in an
17 insulating film" to mean anything other than the
18 contact opening being the cause of the contact?

19 A Are you asking me to recall every
20 conversation in which the word "through" may have
21 come up --

22 Q No. I'm not asking about the word in the
23 abstract, I'm asking about this phrase in
24 particular.

25 A Right. And, as I said several times by

1 now, in semiconductor art, people involved in that
2 field with ordinary skills, when they refer to a
3 structure, they're not refer to a structure with
4 just abstract words, they refer to a structure that
5 describes a structure, they list the material used
6 in that structure, they list the process, the
7 sequence of the processes. And in that context, the
8 words take specific meaning.

9 And I gave an example, when the first
10 wiring is put down followed by the first insulating
11 film, followed by the second wiring, the electrical
12 contact is because of the opening. But that implies
13 a specific sequence of an order in putting down the
14 materials for as long as that order is there, and is
15 such that the first insulating film is interposed in
16 between, the word "through" takes the meaning that
17 you referred to.

18 Q Okay. Well --

19 A And the language in this claim and in other
20 claims have instances where the information is such
21 or the language is specific that that sequence is
22 evident.

23 In this particular claim, both layers are
24 over -- both the transparent conductive layer and
25 the second insulating film are over the second

1 wiring.

2 There is no information in the claims or in
3 the specifications to dictate the specific sequence
4 in order to limit the structure in a particular
5 embodiment.

6 Q So is your answer, yes, you have heard
7 people skilled in the art use the word the way
8 you've just explained?

9 MR. GIBSON: Objection; form.

10 THE WITNESS: In cases where the insulating
11 layer is in between the two conductive layers, yes,
12 I have heard it to be used through an opening to
13 mean because of.

14 BY MR. MANZO:

15 Q Okay. Now, if you look at the patent,
16 which I placed in front of you earlier, I think you
17 should still have a copy there, when a person
18 reasonably skilled, ordinarily skilled, let's say,
19 in the semiconductor fabrication arts or
20 semiconductor arts reads this patent, including
21 looking at the drawings, and sees this phrase in
22 claim 1, namely, the phrase of 1.13 we've been
23 talking about, in the context of this patent, rather
24 than some abstract other structures, does the
25 phrase, "direct contact through an opening in the

1 second insulating film" mean that the contact occurs
2 as a result of the opening in the second insulating
3 film and not otherwise?

4 MR. GIBSON: Objection; form.

5 THE WITNESS: In the context of the '413,
6 where many layers and relationship between those
7 layers is described, there are sections and specific
8 limitations within the claims that dictate or
9 require a specific sequence. And in those cases the
10 word "through" means because of. And someone with
11 ordinary skill in the art will see that order being
12 required and that order being described clearly and
13 will not leave any room for other meaning of the
14 word "through."

15 But those are -- but in this particular
16 section related to the second conductive -- second
17 wiring and the transparent conductive layer and the
18 second insulating film, the language is broad.

19 And in that broad language, as we discussed
20 earlier, there can be two ways to build the
21 structure. And you cannot -- I couldn't find any
22 information to say that one is more likely than the
23 other one, that the patent limits to one and not to
24 the other.

25 BY MR. MANZO:

1 Q Okay. Let me invite your attention to
2 column 13, line 44, please.

3 Do you see the word "through" there on line
4 44?

5 A It says, "by a spacer or the like which
6 penetrates through the resin inter-layer film
7 because of a pressure applied thereto."

8 Is that what you're referring to here?

9 Q Yes.

10 A Okay.

11 Q Is the word "through" in claim 13 -- I'm
12 sorry -- in claim 1, element 1.13, used in the same
13 sense as it appears in column 13, line 44?

14 A The section refers to a spacer that
15 penetrates through the resin, so I think the word
16 "through" in this section means that the resin goes
17 in from one side of the resin and out to the other
18 side of the resin. In other words, the spacer
19 extends throughout -- throughout the resin, so I
20 don't think that word "through" is the same as what
21 we were discussing earlier.

22 Q Professor --

23 A In other words, you cannot construe because
24 of spacer which penetrates because of the resin. In
25 this context, as you see, the meaning, because of

1 for the word "through," doesn't have any context.

2 Q Let me ask you a hypothetical question.

3 Going back to claim 1, which you can look
4 at in the patent, so at the very bottom of column 14
5 it contains the language we've been discussing,
6 namely, "The second wiring and the transparent
7 conductive layer are in direct contact through an
8 opening in the second insulating film."

9 If I had changed the word "through" to the
10 word "via," would it change the meaning that you
11 understand?

12 A Which meaning?

13 Q Well, you've testified that in the context
14 of this patent, the word "through an opening" -- or
15 the phrase "through an opening" can be interpreted
16 two different ways in terms of the structure, I
17 think. And I'm asking you if I make a change in the
18 language, whether it results in a change in the
19 interpretation. And the specific change I'm
20 inviting or calling to your attention is changing
21 the word "through" to the word "via," or some people
22 pronounce it "vee-a."

23 Do you understand my question now?

24 A I understand your question.

25 Q Okay. What do you think?

1 A I'm not sure all the different ways that
2 the word "via" can be construed, but, in general,
3 you're taking a section of the entire claim in
4 absence of the information that is described within
5 the claim, and you try to limit a structure to a
6 particular structure. And to do that, I don't think
7 you -- I mean, you can do it, especially with a
8 word, and if you choose the right word, maybe you
9 can lead someone skilled in the art to understand a
10 specific structure is the one that is referred.

11 But, in general, the information of the
12 entire claim is relevant.

13 Q Well, I don't mean to take a phrase out of
14 context of the entire claim. I do want you to
15 construe my hypothetical in the context of the
16 entire claim and the patent as a whole.

17 A You asked me to construe the word "via"?

18 Q I'm asking you if the word -- instead of
19 the word "through" at column 14, line 66, if the
20 word, instead, were via would it have a specific
21 meaning for you and the person in the ordinary skill
22 in the art, namely, that the contact we are talking
23 about, the direct contact, occurs by virtue of the
24 whole.

25 A I'm not a language expert, so I do not

1 think that I am qualified to construe words in
2 absence of a dictionary or some study of the meaning
3 of the words and relevant meaning.

4 Q Fair enough.

5 A If you -- go ahead.

6 Q I'm asking how a person of ordinary skill
7 in the art -- let me ask.

8 How would a person in the ordinary skill in
9 the art convey the idea that it is the contact that
10 permits the open -- no, that it is the opening that
11 permits the contact to occur?

12 MR. GIBSON: Objection; form.

13 BY MR. MANZO:

14 Q In this particular contact we are talking
15 about.

16 THE WITNESS: If the sequence of the layers
17 is listed in a specific way, similar to the way that
18 the other layers that we discussed earlier were
19 listed -- so, for example, first wiring, first
20 insulating film over the first wiring, a second
21 wiring over the substrate and the first insulating
22 film -- you see, in this case you list the layers
23 and you list, specifically, the order with which the
24 layers are put down, and then you explicitly state
25 that the first insulating film is in between the

1 first wiring and the second wiring.

2 So, in that case, the word "through" -- and
3 that word "through" appears in the limitations. It
4 says, "Wherein the first wiring and the second
5 wiring are in electrical contact through an opening
6 in the first insulating film," so in view of the
7 limitations listed above would describe a specific
8 sequence, the word "through" means because of.

9 In this case, it lists two layers, a
10 conductive layer and an insulating layer above the
11 second wiring, and it does not dictate a specific
12 order.

13 So someone with ordinary skill in the art
14 will understand there are two ways to build that
15 structure. And only one of those two ways the word
16 "through" means because of.

17 BY MR. MANZO:

18 Q Well, if I change the word "through" in
19 1.13 to the words "because of," would that be enough
20 to mean that it is only because of the opening that
21 the contact occurs in section 1.13?

22 MR. GIBSON: Objection; form.

23 THE WITNESS: I think if the inventors
24 wanted to have a specific language to interpret --
25 to construe the word "through" is "because of," the

1 inventors could have listed the order of the layers
2 in the earlier parts of the claim in such as they've
3 done for the first wiring and the second wiring and
4 the first insulating film. They could have list the
5 order between the transparent conductive layer and
6 the second insulating film so that whatever apply
7 earlier, it can also be applied for this one.

8 So, in other words, you don't, necessarily,
9 need to change the word "through" here to mean
10 because of, but you can just list in the earlier
11 part more specific order with which the layers will
12 be put down.

13 So, for example, if you say "a transparent
14 conductive layer over a first region of the second
15 wiring and over the second insulating film," then
16 all the discussion that we had for the last two
17 hours would be irrelevant, because then someone with
18 ordinary skill in the art would understand that the
19 second insulating film is in between the second
20 wiring and the transparent conductive layer, hence
21 the opening is because -- hence the contact because
22 of the opening.

23 But, in that case, it would be more elegant
24 also to change the word "indirect contact" to what
25 was listed earlier and refer to as an electrical

1 contact. Because if you have the two layers, one
2 above the other, and you have an insulating layer in
3 between and you have contacts, then the two layers
4 are an electrical contact -- sorry -- yes, the two
5 layers are in electrical contact.

6 In other words, the entire layer is in the
7 same potential as the other layer, and not only
8 where they are in direct contact.

9 So the direct contact here is a little bit
10 confusing what it means.

11 Does it mean that the one transparent
12 conductive layer to overlay completely the second
13 wiring or do you want the transparent conductive
14 layer to be an electrical contact?

15 So I would change the sequence of the
16 layers and I would change the word "indirect
17 contact" with the term "electrical contact."

18 And that part is also used, the part of
19 electrical contact is listed in two limitations, in
20 the one that says, "the first wiring and the second
21 wiring on electrical contact through an opening in
22 the first insulating film," and is listed, "wherein
23 the second wiring and the flexible printed circuit
24 are in electric contact through the transparent
25 conductive layer."

1 In both those cases, the two elements, they
2 are not in direct contact, they are in electrical
3 contact, because there is something else between the
4 first wiring and the second wiring, there is an
5 opening. And in the second case there is the
6 transparent conductive layer in between the second
7 wiring and the flexible printed circuit.

8 BY MR. MANZO:

9 Q Professor, why don't you look at the figure
10 that's on the cover of the '413 patent, the first
11 page, and I think you will see that is Figure 4A.
12 You can look at either one.

13 Isn't it correct to say that in this figure
14 the -- there is a substrate, 101, and there is a
15 first electrical layer called auxiliary lines, 401;
16 is that right?

17 A Yes.

18 Q And above that is a first insulating film,
19 112; is that right?

20 A Yes.

21 Q And there are openings that are in
22 insulating film, 112, right, contact openings?

23 A Correct.

24 Q And above layer 112 is the second
25 electrical wiring, marked as 403, external

1 connection lines.

2 Do you see that?

3 A Yes.

4 Q And that second -- sorry. Strike that.

5 And those lines, 403, make electrical
6 contact with line 401 through the openings of which
7 three are shown in that figure; is that right?

8 A Correct.

9 Q Okay. Now, above -- on the top of the
10 second wiring, 403, on the left side, do you see a
11 resin inter-layer film, 113, right?

12 A Yes.

13 Q And on the right-hand side of the figure
14 you see above this external connection line, 403,
15 you see an ITO film, 114, above which is the
16 flexible printed circuit, 107; is that right?

17 A Yes.

18 Q Now, on this figure, is it fair to say that
19 electrical contact of the ITO film, 114, with the
20 external connection line, 403, is because of an
21 opening in the resin inter-layer film, 113?

22 MR. GIBSON: Objection; form.

23 THE WITNESS: As we discussed earlier,
24 there are two ways to put down ITO and this
25 insulating film called resin.

1 So in this drawing, 113, the insulating
2 layer is right above 403, the external connection
3 lines, since the contact between 114, the -- the
4 electrical contact between 114 and 403 is because of
5 the opening. Because if it wasn't the opening, the
6 114 would be laid above the insulating film, 113.

7 But this is one of two possible ways of
8 constructing the structure.

9 BY MR. MANZO:

10 Q What's the other way?

11 A The other way is to put 114 right above
12 403, and then put the 113 above 114.

13 Q But that's not how it's shown in this
14 figure, is it?

15 A No. This figure is one embodiment. But
16 the claim language is broad, that it covers both
17 embodiments.

18 And there is nothing in the specifications
19 to describe that structure, either. The language in
20 the specifications is as broad as the language in
21 the claims.

22 In this particular case there is nothing in
23 the specifications, either, to help someone construe
24 the word "through."

25 Q Does the specification use the word

1 "through" in the sense that you've been using it as
2 a possibility?

3 MR. GIBSON: Objection; form.

4 THE WITNESS: Referring to the Figure 4A,
5 the only relevant sections that I found is in column
6 8, and it reads -- column 8, line 52 to 55, and it
7 reads, "Referring to FIG 4A, the external connection
8 lines 403 are electrically connected to an FPC,
9 (flexible printed circuit) 107 through contact holes
10 provided in the resin inter-layer film 113 through
11 an ITO (indium tin oxide" film 114."

12 That's the only part that I found. And in
13 this case the word "through" clearly mean because of
14 the contact holes in the resin, because the resin
15 can be construed -- can be applied above the other
16 embodiment that I described.

17 So if you have the ITO on top of the
18 external connection lines and you have the resin
19 above that part, then you will cover the
20 metallization of the substrate.

21 So you need contact holes to expose the
22 metal lines in the substrate, the external
23 connection lines in the ITO, in order to make the
24 electrical connection to the flexible printed
25 circuit.

1 So the section I referred, it can cover
2 both embodiments.

3 (Deposition Exhibit 2009 was marked
4 for identification by the court
5 reporter and is attached hereto.)

6 BY MR. MANZO:

7 Q Professor, do you recognize Exhibit 2009?

8 A Correct.

9 Q Do you recognize it as a semiconductor
10 structure?

11 A What do you mean by "semiconductor
12 structure"?

13 Q Is that what's shown in this figure?

14 A It is wiring elements and insulating
15 elements. There is no insulating -- there is no
16 semiconductor material disclosed in this particular
17 section.

18 So you're referring whether it is a
19 microelectronics structure used in the field of
20 making semiconductor devices, the answer is yes.

21 You're asking whether there is any
22 semiconductor material, I do not recollect seeing
23 any semiconductor material in Figure 1B.

24 Q Okay. Thank you for that clarification.

25 Now, this is a figure from the Sukegawa

1 reference; is that right?

2 A Correct.

3 Q So let's identify what some of these
4 structures are.

5 A May I refer to the entire Sukegawa
6 reference?

7 Q Of course. Let me give you a copy of that.
8 I'm handing you a copy of Exhibit 1003.

9 Let me just ask you to confirm a couple of
10 things, preliminarily. The part marked number 2 is
11 a metal wiring; is that right?

12 A That's correct.

13 Q And the part number 3 is insulation?

14 A That's correct.

15 Q And the part 7 is wiring?

16 A Correct.

17 Q And the part 8 is a transparent conductive
18 layer?

19 A Yes.

20 Q And part 9 has been called a protective
21 layer, or what would you call part 9?

22 A It's another insulating layer that serves
23 as passivation.

24 Q Okay. Does Sukegawa suggest that it be
25 nitride, do you remember?

1 A I believe so. That's an insulating layer.

2 Q Okay. What is part 6?

3 A Part 6 are openings in that insulating
4 layer labeled element 3.

5 Q Is there an opening in the protective layer
6 or the passivation layer 9?

7 A Yes.

8 Q Would you call it a contact opening?

9 A It is an opening, something is going to
10 come in contact; you can refer to it as a contact
11 opening.

12 Q Okay.

13 A But, as I said earlier in my testimony,
14 different openings have, in the art, different
15 terminology. In my lab we call that glass cut and I
16 believe in the industry we call it also glass cut.
17 We generally refer to them as openings.

18 Q So the opening in 9 is something you refer
19 to in your lab as a glass cut; is that right? Is
20 that what you said?

21 A Without making connections to flexible
22 printed circuit in my lab, but we have different --
23 we refer to openings with different names, so then
24 we can understand with what opening we're referring
25 to in the structure.

1 So in my lab we call one contact --
2 actually, I call them active contact, we call
3 another one via and we'll call another one glass
4 cut. I recollect three names. We call them all
5 contacts, we have different language. Which contact
6 were you referring to?

7 Q I'm referring to the contact -- I'm
8 sorry -- I'm referring to the opening in 9.

9 A I understand. So that opening can be
10 called opening, it can be called contact, it can be
11 called glass cut. I don't know how the engineers at
12 NEC may have labeled that opening or name that
13 opening. I gave you names that we use in our
14 laboratory to refer to a specific opening. We call
15 them all openings or contacts.

16 We have to use words and describe which
17 one, so sometimes we refer to them as -- we give
18 them specific names. But that's for convenience
19 purpose.

20 Q Thank you.

21 So with reference to Exhibit 2009, can you
22 point out the -- do the words "metes and bounds"
23 carry a meaning for you? Do you understand that
24 phrase?

25 A No -- I may have heard it in other context,

1 but --

2 Q Okay.

3 A -- perhaps use it more specific.

4 Q Can you please delineate the opening in
5 region 9 or film 9 on Exhibit 2009?

6 A Indicate the opening in Figure 9?

7 Q Indicate the opening --

8 A Sorry. In Figure 1, the opening in the
9 element labeled 9?

10 Q Yes, please.

11 A I think I've done that in my declaration.
12 Can I refer to my declaration?

13 Q Sure.

14 A It's a different figure. Whatever is --
15 the figure is the same, the underlying structure is
16 the same, but Figure 2, she has other elements on
17 top of it.

18 Q Well, I have a copy of 2, which we can get
19 to in a minute.

20 A Okay.

21 Q But in your declaration you gave us a
22 double-headed arrow that shows us the left side and
23 the right side of the opening, I think, or tells us
24 where they are.

25 Do you understand what I mean?

1 A This one?

2 Q Yes.

3 A Yeah.

4 Q So what I'm really asking you to do is to
5 tell me where the rest of the opening is.

6 You've shown us horizontally. Where is it
7 vertically?

8 MR. GIBSON: Objection; form.

9 THE WITNESS: That would depend on the
10 layout of that particular element. So how far that
11 contact extends outside the plane where this one is
12 indicated would depend upon the planar section view,
13 and I cannot say just from the cross section, if I
14 understand your question well.

15 BY MR. MANZO:

16 Q I probably haven't explained it very
17 clearly. Let me try it a different way.

18 Can you draw a box on the exhibit to show
19 us where the opening is in layer 9 at this
20 particular cross section?

21 A You mean a box, meaning a 3D object?

22 Q No, not 3D. 2D.

23 A In semiconductor art, you involved in
24 semiconductor art as we discussed, you have friends
25 in that field, you may be familiar that we use terms

1 such as a layout. So layouts are 2D representations
2 of the structure. And this tells us where the
3 opening is, how -- what is the length and width of
4 that opening.

5 So from a cross section you are only going
6 to be able to get a 1D representation of the
7 opening; in other words, tells you what is the
8 length in this direction where that cross section
9 was taken.

10 The Z direction only refers to the
11 thickness of the film, and that's something that in
12 the processing we use timing.

13 There is nothing in the -- it is not
14 something in the design that we use to refer to the
15 opening, at least in the mask design. I'm not --
16 maybe I am sounding too technical here. Please
17 guide me and help me what you exactly want me to do.

18 Q Okay. I wasn't really thinking about the
19 mask or the layout that you would see from above,
20 but rather just in this cross sectional view I'm
21 trying to understand the horizontal and vertical
22 limits of the opening in the part number 9.

23 MR. GIBSON: Objection; form.

24 BY MR. MANZO:

25 Q Can you tell me what those are?

1 MR. GIBSON: Objection; form.

2 THE WITNESS: Well, in general, the
3 vertical limits are the walls of the layer, and
4 these are the -- so we go to one end of what we
5 define from the mask as being the start of the
6 opening, and then we go to the other end, the
7 opposing end in that direction, let's call that the
8 X direction. And then we go in the 3D structure or
9 in the cross section of the structures, and we look
10 at the thickness of the layer in that region and we
11 then say, okay, if D is the thickness of the layer,
12 then the depth in that -- of that contact is D. Or
13 it can be a micron or half a micron or a hundred
14 nanometers or whatever that number is.

15 Is that what you're asking me to do?

16 BY MR. MANZO:

17 Q Yes.

18 A And that thickness typically is required by
19 the process engineer to adjust the etching time so
20 that the etching time can then be appropriate for
21 etching and removing the layer to form the opening.

22 So the -- in that contact, if I understand
23 the context of your question, the two opposing ends
24 of the contact are -- one is the vertical wall that
25 is between the numbers 8 and 9, and the other one is

1 opposing end to the other -- to the far right of
2 that structure.

3 Q Would you please delineate the contact
4 opening -- or the opening in 9 with this red pen,
5 please, on Exhibit 2009.

6 A So what, exactly, do you want me to
7 delineate?

8 Q The opening in the layer 9.

9 A In the Z direction or in the X direction?

10 Q On this piece of paper.

11 MR. GIBSON: Objection; form.

12 THE WITNESS: Right. In the Z direction or
13 in the X direction?

14 BY MR. MANZO:

15 Q Both directions.

16 All right. Further considering -- just to
17 clarify, you drew a horizontal line with two arrows,
18 arrowheads, and a vertical line with two arrowheads?

19 A Right.

20 Q So in the horizontal line, are the
21 arrowheads at the vertical walls of film 9, one over
22 on the left side and one over on the right side of
23 the figure? Is that where the opening stops?

24 A Can you repeat the question?

25 Q I just want to clarify that the opening

1 stops at these vertical walls that you testified
2 about earlier, the opening in 9.

3 A The lateral extent of the opening in 9 in
4 the direction parallel to the long side of these
5 figures, it starts from one vertical wall and ends
6 to the other vertical wall. And the thickness of
7 the layer 9 is indicated by the smaller double arrow
8 that starts from its bottom -- where it touches its
9 previous layer and extends to the upper surface of
10 it.

11 Q Now, regions or films or layers -- let's
12 pick a term. Let's call these layers 7 and 8 in
13 this figure.

14 Can you tell whether they were in
15 electrical contact before the opening in 9 was
16 established?

17 MR. GIBSON: Objection; form.

18 THE WITNESS: Electrical contact -- they be
19 able to pass electricity through the opening?

20 BY MR. MANZO:

21 Q I'm sorry. Could you please repeat that?

22 A You asked me whether there is electrical
23 contact before the opening in 9 was established, and
24 I ask a clarification question, is: By electrical
25 contact, meaning the ability to pass electrical

1 current?

2 Q Yes, from 8 to 7 or vice versa?

3 A Before the opening?

4 Q Before the opening in 9 occurred.

5 A Well, 9, according to the specification of
6 Sukegawa, covers the entire surface of the
7 substrate. And the entire surface of the substrate
8 then is -- it is insulating so no current can flow
9 in and out of the entire structure.

10 Q I see. Well, was layer 7 made before layer
11 8?

12 A That's correct.

13 Q And was layer 8 made before layer 9?

14 A That's correct.

15 Q And was layer 8 directly in contact with
16 the top surface of layer 7 before layer 9 was put
17 there?

18 A That's correct.

19 Q And is that direct contact between 7 and 8?

20 A The two layers touching each other.

21 Q You would call that direct contact, right?

22 A You can call it touching, direct contact.

23 Q You can also call it ohmic contact?

24 A What's that?

25 Q Ohmic.

1 A Ohmic, again, implies the passage of
2 current. There is two kinds of contacts; there is
3 ohmic contact and schottky contact. That depends
4 what are the layers 7 and 8 and whether that contact
5 will be ohmic or not, maybe a native oxide in one of
6 the layers that would prevent the ohmic contact
7 formation, and that may require some annealing steps
8 at the end of the process to establish ohmic
9 contact.

10 So it is a little bit not clear at this
11 point whether the contact from an electrical
12 perspective will be an ohmic contact or not, but the
13 two metals touch each other.

14 Q Okay. So is it fair to say that there was
15 direct contact between layers 7 and 8 before the
16 opening was cut in the region or the film 9?

17 A The layers are put down sequentially, so,
18 yes, so one is on top of the other.

19 MR. MANZO: Okay. Counsel, is this a good
20 time to break for lunch?

21 MR. GIBSON: That's fine.

22 BY MR. MANZO:

23 Q Is that okay with you if we break for
24 lunch, Professor?

25 A That's fine.

1 Q Thank you.

2 THE VIDEOGRAPHER: We are off the record.

3 The time is 12:35 p.m.

4 (Recess.)

5 THE VIDEOGRAPHER: We are back on the

6 record. The time is 1:44 p.m.

7 BY MR. MANZO:

8 Q Professor, good afternoon.

9 A Thank you. Good afternoon.

10 Q From the time we began the deposition this
11 morning up until now, have you discussed your
12 deposition with anybody?

13 A No.

14 Q Before the lunch recess we were talking
15 about Figure 1B, which was marked as Exhibit 2009,
16 Figure 1B of Sukegawa, that is. And when I asked
17 you about electrical contact, I think you adverted
18 to or made mention of potentially an oxide layer on
19 top of 7 that would have to be annealed away or
20 something like that.

21 Do you remember discussing that or
22 mentioning that?

23 A I think that was in the context of you
24 saying whether the contact is ohmic.

25 Q Okay. Well, my question really is -- let

1 me try it a different way.

2 From looking at Figure 1B, would a person
3 of ordinary skill in the art conclude that film 8
4 and film 7 were in electrical contact with each
5 other before nitride layer 9, or if layer 9 is made
6 from something else, then whatever it is made of, is
7 placed in the position we see it in Figure 1B?

8 MR. GIBSON: Objection; form.

9 THE WITNESS: In Figure 1B the layer 7 and
10 8 are in physical contact.

11 BY MR. MANZO:

12 Q Are they also --

13 A And before --

14 Q Sorry.

15 A And before nitride layer 9 were down, they
16 were exposed so one could pass current through them,
17 can pass current from 8 to 7, or if, from another
18 region, current was coming to 2. If 2 was exposed
19 through another opening somewhere, it was coming
20 from 2, then that current can pass through 7 to 8.
21 And now to whatever the electro circuit that may be
22 formed at the time.

23 But after we are putting in layer 9, there
24 is a passivation layer over the stack of layers 7
25 and 8, and no current could pass through before we

1 have an opening in 9.

2 Q When you say, "no current could pass
3 through," do you mean no current could pass from
4 something above where 9 is until the opening in 9
5 was created? Is that what you mean?

6 A Right. 9 -- from one side of the substrate
7 you have the glass substrate, that's element 1, so
8 knowing can come from that side. And the glass is
9 fairly thick.

10 If you have 9, then you are completely
11 isolate -- you put an insulating layer on top of the
12 entire structure, the entire surface.

13 So everything which is enclosed between 1
14 and 9 are completely isolated from the outside world
15 and no current can pass through into the structures
16 unless you have an opening in 9.

17 Q But you still agree that layers 7 and 8 are
18 in electrical contact with each other?

19 MR. GIBSON: Objection; form.

20 THE WITNESS: The ability to pass current
21 from one to another is there, but for the current to
22 pass through, you need to have something connect,
23 like a battery or some sort of inlet or source.

24 And if that 7 and 8 are completely enclosed
25 by insulating layers, that current cannot come from

1 anywhere. And the -- so the layers may be in
2 physical contact. And if means to provide the
3 voltage and a vias are created, then they can pass
4 the current. But when they are completely isolated,
5 I do not see how that ability to create a current
6 can be established.

7 BY MR. MANZO:

8 Q So what I understand you to be saying,
9 Professor, is that current flows only when there is
10 a circuit, and there is no way to make a circuit if
11 both sides of this was covered, one side with the
12 glass substrate, 1, and the other side with the
13 nitride, 9?

14 Do I understand you correctly?

15 A Right. If 9 completely covers the surface,
16 the top surface, and 1 is covering the backside of
17 all the structures, there is no means to connect
18 into a board or into a source that will provide the
19 voltage in order to generate the current.

20 Q Understood.

21 Is it fair to say that, notwithstanding
22 that, there is electrical contact, not necessarily
23 current flow, but plain old electrical contact
24 between 7 and 8, regardless of 9?

25 MR. GIBSON: Objection; form.

1 THE WITNESS: You have two metals that are
2 actually in physical contact so they have the
3 ability to conduct electricity from one to another.
4 But if you don't have a voltage difference between
5 them, you will not be able to conduct any current.
6 And so an opening in 9 is required for an external
7 connection to be made, such as that for the flexible
8 printed circuit, which will then bring the current
9 from an outside source to be passed through the
10 circuit and the devices that you have on substrate
11 100. And while you are passing the current, it will
12 be passed through 7 and 8.

13 BY MR. MANZO:

14 Q Correct me if I'm wrong. What you're
15 saying is that the two layers, 7 and 8, are in
16 direct contact and would permit electrical current
17 flow between them if there were electricity applied
18 to one or the other; is that right?

19 MR. GIBSON: Objection; form.

20 THE WITNESS: Well, to have a current flow,
21 you need a voltage difference between two elements.
22 So you need to have a voltage source somewhere and
23 another connection somewhere else that will be at a
24 different voltage.

25 So one would be like at 5 volts and the

1 other to zero volts, which we refer to as ground.
2 In that case, then current -- you establish the
3 voltage difference and then current flows.

4 BY MR. MANZO:

5 Q Okay.

6 A But if all the layers are buried under
7 insulating layers and there are no openings for
8 something to be providing an excitation from
9 outside, provide a signal from outside, the layer 7
10 and 8, by themselves, will not generate any
11 currents.

12 I think it is a matter of definition what
13 will define one.

14 Q Okay. Would it be possible, Professor, to
15 have -- since this is just a cross section, if I had
16 current or a voltage potential applied to 7
17 somewhere in front of the page and a different
18 voltage applied to 8 somewhere behind the page,
19 there could be a circuit and current would flow from
20 7 to 8; is that true?

21 MR. GIBSON: Objection; form.

22 THE WITNESS: If you had openings in the
23 insulating layer 9 or if you have openings through
24 the glass substrate 100 and you apply a voltage
25 difference, then current will flow.

1 BY MR. MANZO:

2 Q That's good.

3 A But you need to have those openings.

4 Q If there were a buildup of static charge
5 somehow on 8, would it flow to 7?

6 MR. GIBSON: Objection; form.

7 THE WITNESS: The buildup of static
8 charge -- the buildup of electric charges on 8 more
9 likely will develop before it gets passivated from
10 9. The charges are created through, like, friction.
11 Once 7 and 8 are completely covered, the charge will
12 be generated most likely in 9 and not in 7 or 8.

13 But this is a hypothetical question that
14 you're referring --

15 BY MR. MANZO:

16 Q Yes. Yes, it is.

17 So, Professor, is it your testimony that
18 there is no electrical contact between 7 and 8 in
19 this Exhibit 2009 unless current is flowing between
20 the two of them? Is that your testimony?

21 A My testimony is that 7 and 8 are in
22 physical contact, they have the ability to conduct
23 electricity from one to another, but that
24 electricity has to be generated or closed through
25 the application of the voltage difference or some

1 other excitation source that will be coming from
2 outside, and that one will require a physical
3 opening.

4 (Deposition Exhibit 2010 was marked
5 for identification by the court
6 reporter and is attached hereto.)

7 BY MR. MANZO:

8 Q Professor, can you identify what's been
9 handed to you as Exhibit 2010.

10 A It's a Figure 2C from the same patent that
11 we are discussing, namely, Sukegawa.

12 Q What's the difference between Figure 1B and
13 Figure 2C? Let me withdraw that question.

14 Apart from the addition of the structure
15 31, which is a flexible wiring substrate, having a
16 film, 31A, and a copper foil, 31B, and the film 10
17 between member 31 and the lower portion of the
18 figure and the sealant -- not the sealant, strike
19 "the sealant" -- the silicone resin 13, are there
20 any other differences between these two exhibits?

21 A Well, some of the elements are not labeled
22 in 2C compared to Figure 1B, but as far as the
23 additional components, what you listed is correct.

24 Q Okay. So would your testimony about
25 electrical contact between films 7 and 8 be the same

1 with regard to Figure 2C as it was with regard to
2 Figure 1B?

3 A Well, in figure -- when you asked me
4 earlier about electrical contact, you are always
5 referring to before the opening of -- in the
6 passivation layer 9, at least that's how I
7 understood you.

8 In Figure 2C you have an opening in layer
9 9, so the layers are -- can be connected to the
10 outside world. And, as shown in Figure 2C, there is
11 a connection to the flexible printed circuit, 31,
12 that provides such connection to the outside. Maybe
13 it could be a power supply, maybe a board that
14 provides signals that will going to the circuitry
15 within the display, which is fabricated on the
16 glass, element 1.

17 Q Okay.

18 A So in Figure 2C we have the ability to
19 provide and have current flowing because the
20 connection is established to the outside world.

21 Q Just to complete that thought, I think what
22 you're saying is that the flexible printed circuit
23 31 structure can apply a voltage via the conductive
24 film 10 to the upper surface of layer 8 and develop
25 a voltage on that, and that voltage would be an

1 electrical -- would flow to wiring 7; is that right?

2 A What does it say there? You need two
3 connections, you need to have a voltage difference.
4 If 31 makes a connection and it comes up and
5 provides the voltage, if you don't have another
6 connection somewhere else to establish that voltage
7 difference, current and/or flow, you need always to
8 have a voltage difference for the current to flow.

9 But if 2 leads, for example, into a
10 capacitor and that capacitor is -- the other
11 terminal of the capacitor is connected to the
12 ground, then you may have a transient current
13 flowing until you completely charge the capacitors.
14 The capacitors or capacitor.

15 But if you talk about only like ohmic
16 contacts between two different points and the
17 continuous passage of current between those two
18 reference points, you need to have two connections.

19 But, in general, in operation of the
20 display, multiple connections are provided, such as
21 shown in Figure 2C. And during operations currents
22 flow from -- through these external connections.

23 Q Thank you. So in a nutshell are you saying
24 that layers 7 and 8 are in electrical contact in
25 Figure 2C, but they are not in electrical and

1 contact in Figure 1B?

2 A I did not say layers 7 and 8 are not in
3 electrical contact. I said they are in physical
4 contact and they have the ability to conduct
5 electricity. But to have -- conduct electricity,
6 you need to provide an external source.

7 Q When you say "an external source," you mean
8 in Figure 1B?

9 A It's like what you say in Figure 2C, you
10 have a flexible printed circuit board that is making
11 contact to layer 8, and you're referring earlier in
12 Figure 1B in your questioning, you're referring to
13 Figure 1B with the passivation layer covering
14 completely layers 7 and 8 and you're asking me
15 whether 7 or 8 are in electrical contact before
16 opening, before moving 9 from above. And I
17 responded that before removing 9, you do not need to
18 provide connections to 7 and 8 in order to conduct
19 electricity. The ability to conduct electricity is
20 established after opening and removing layer 9 above
21 7 and 8, after creating the opening.

22 Q Okay. So let me see if I can summarize it
23 this way.

24 In Figure 1B --

25 A Before the opening or after the opening?

1 Because you referred to both of those things
2 earlier.

3 Q Understood. Listen to the question.

4 With regard to the structure in Figure 1B,
5 I think what you're saying is that the layers 7 and
6 8 are in direct contact and have the ability to
7 conduct electricity from one to the other, and I
8 understand from your testimony that providing the
9 opening in the passivation layer 9 gives you the
10 ability to connect a circuit or a source of
11 electricity to let that current flow to occur; is
12 that right?

13 A Correct.

14 Q Okay. Is it true that in your declaration,
15 which is Exhibit 1005 -- and specifically with
16 regard to Sukegawa, you do not refer to Figure 3A,
17 B, C, D or E?

18 I should make that more precise by saying
19 you do not refer to any of those figures, 3A, B, C,
20 D or E; is that correct? Well, strike that.

21 A Yes, the answer is not correct.

22 Q I see it at page 35.

23 Do you see it anywhere else?

24 A Multiple occasions, 35, 37.

25 Q All right. For what purposes do you cite

1 in Figure 3?

2 MR. GIBSON: Objection; form.

3 BY MR. MANZO:

4 Q In your declaration.

5 MR. GIBSON: Objection; form.

6 THE WITNESS: Well, in my analysis I was
7 giving the '413, and '413 has several claims, and
8 each claims has a series of statements which is
9 referred to as limitations of the claims. So I have
10 studied the prior art, and I was looking where those
11 limitations are either met or provide enough
12 information through the figure, through the text or
13 through combinations of other pieces of prior art to
14 make those limitations obvious.

15 BY MR. MANZO:

16 Q Okay. So starting at page 35 with regard
17 to section X, Roman numeral X, which started on page
18 32 of your declaration, the first time that I see
19 Figure 3 is Figure 3D on page 35.

20 Do you see that?

21 A That's correct.

22 Q Okay. So is it fair to say that you cite
23 Figure 3D to show that there is a color filter that
24 is just outside the connection of the flexible
25 wiring circuit and sealed with an active matrix

1 substrate? Is that why you cited it?

2 I'm at the language right above Figure
3 3D -- I'm not trying to change anything -- starting
4 on line 5 of that page.

5 A Well, if -- you're referring to paragraph
6 99?

7 Q Yes, paragraph 99, the fourth line of that
8 paragraph.

9 A But if you look at paragraph 98, which
10 is -- provides the, more or less, kind of the
11 rationale of why I'm referring to this one is
12 because the paragraph 98, it reads, "Paragraph 8 of
13 Claims 1, 7 and 10, and Paragraph 9 of Claims 17, 22
14 and 24 requires 'a sealant over the first wiring in
15 the second region of the second wiring.'"

16 So this is what is required in the claims
17 of '413. So in 99 I describe evidence that that --
18 those elements are present in Sukegawa.

19 Q Okay. Now, do you agree that Figure 3D
20 does not show the sealant?

21 MR. GIBSON: Objection; form.

22 THE WITNESS: To someone skilled in the
23 art, when the text refers to the -- let me cite
24 exactly from Sukegawa.

25 BY MR. MANZO:

1 Q Let me help you.

2 Are you saying that it is implicit from
3 Figure 3D, but it's not really shown there in a
4 drawing; is that right?

5 A Well, the sealant is in between 200 and 100
6 at the -- close to the vertical edge of 200 that is
7 shown. And there is an arrow pointing to where the
8 sealant would be.

9 So the fact that an element is not shown
10 explicitly in this schematic is not the proof that
11 that element is not there.

12 For example, in Figure 3D we do not see
13 anything before the element 10. So we don't see the
14 line 2, we don't see the wiring of 8, 7, we do not
15 see all that -- all that level of detail.

16 So it doesn't mean that this flexible
17 printed circuit board element 300 is just connected
18 to the glass substrate that doesn't do anything, it
19 is implied that all the other elements are there.

20 So when the specifications in Sukegawa
21 refer to the color filter substrate and say it is
22 sealed with the active metric substrate, that,
23 inherently, is implied that there is a sealant
24 between them, otherwise the liquid crystal would not
25 be contained within.

1 And before attaching element 300, the gap
2 between elements 200 and 100 is filled with the
3 liquid crystal. So if it goes to fill that, the
4 liquid crystal will not be contained in the display
5 and the display will not function. The element 300
6 comes after the information of the sealant and after
7 the filling with the liquid crystal.

8 Q I understand. Just to make it clear, you
9 agree that the sealant between 100 and 200 is not
10 explicitly shown in Figure 3D, correct?

11 A Explicitly shown like a drawing of an
12 element and a numeral referring to that element
13 saying that that's the sealant or that the sealant
14 is not at all present or implied in Figure 3D?

15 Q I'm not asking about implied. I'm just
16 asking about whether it is literally shown in Figure
17 3D.

18 A What Figure 3D literally shows is the two
19 substrates, 100 and 200, and some of the other
20 elements which are not related to the sealant, but
21 it shows the 100 and 200 and the specifications, the
22 text within Sukegawa, referred to that -- the two
23 substrates and referred to them as being sealed.

24 Q Okay. But the sealant is not pictured
25 here; is that right?

1 A As I said, the level of detail of this
2 figure is such that it shows that the two
3 substrates, the sealant is in between them and close
4 to the vertical edge of 200 and referred to it in
5 the text.

6 I don't know -- I don't understand what
7 your line of question is trying to say. Are you
8 trying to say the sealant is not present? I
9 disagree.

10 Q No, I'm not asking you that, Professor.
11 I'm just asking if it is shown pictorially. That's
12 a plain vanilla question.

13 A This shows the two substrates, 100 and 200,
14 and the text is referred to that assembly as being
15 sealed.

16 Q Let me try it another way. Does it show
17 200 and 100 with no space between those two?

18 MR. GIBSON: Objection; form.

19 THE WITNESS: I don't understand what
20 you're trying to do. It doesn't show also some of
21 the other elements, so it doesn't show the wiring 2,
22 it doesn't show the layer 3, the wiring 7 and 8.

23 Are you going to try to also tell me that
24 those elements are not there, so people attaching
25 these flexible printed circuit for nothing?

1 So the fact that something is not
2 showing -- is not shown or is not referred to by a
3 numeral in the artwork is not an indication that
4 something is not there, but that the purpose of the
5 artwork is to point out the presence of some of the
6 elements that are described in the -- in the
7 specific -- in the specifications and the relative
8 relationship of those elements, and other elements
9 may not be shown in the artwork, but, clearly, in
10 light of the entire specifications and descriptions,
11 those elements are there, are implied.

12 BY MR. MANZO:

13 Q Professor, what kind of apparatus is used
14 for forming a conductive layer in a liquid crystal
15 display device?

16 A There are different apparatuses that are
17 used to provide -- that are used to form a
18 conductive layer in a liquid crystal display.

19 Q Could you tell us the different kinds?

20 A One is called an evaporator, another is
21 called a sputterer, another one called CVD, chemical
22 vapor deposition, laser-assisted depositions, just
23 to name a few.

24 Q So you named four. An evaporator, a
25 sputterer, a CVD apparatus and a laser-assisted

1 deposition apparatus?

2 A I named a few, depending on the layer and
3 depending upon the extent to which that layer --
4 whether that layer will be a thin layer or thick
5 layer, there are other techniques, like screen
6 printing, for example, which is typically used in
7 solar cells. But in some of the new displays for
8 printable electronics, new methods may be used
9 beyond what I mentioned. I think I gave you some
10 representative examples.

11 Q Okay. Thank you.

12 Now, what kind of apparatus is used for
13 patterning a conductive layer in an LCD device being
14 constructed? How is that done?

15 A In general -- in the general field of
16 microelectronics, we refer to two general processes,
17 the additive processes and the subtractive
18 processes.

19 In the additive -- sorry.

20 In the subtractive processes, which is the
21 majority of the steps I perform, you deposited a layer
22 everywhere and then you go through a process known
23 as photolithography, and then you define the regions
24 that you want to leave.

25 And through a sequence called etching

1 style, you remove the layers that are not protected
2 by the layer called photoresist, which is patterned
3 through the photolithographic process.

4 That's the common thing for making the
5 features that we see in most of these figures.

6 There is also the additive process in which
7 you selectively place material down only the regions
8 that you need and you do not have to go through the
9 other steps that I mentioned, namely, the
10 photolithography and etching steps, because the
11 material is put down only where you need it and
12 nowhere else.

13 An example of an additive process is if you
14 deposit a material in one of the apparatus that I
15 mentioned earlier, but you have a screen, you have a
16 layer like a metal sheet that has openings, and the
17 openings define the regions where the thin film that
18 you will deposit will go onto the substrate and the
19 screen or that metal sheet chemical will then block
20 that layer from -- and prevent that material to be
21 deposited and flow anywhere else on the surface.

22 And that could be an example of an additive process.

23 Q Are you saying metal slit or metal sieve?

24 I just didn't understand you.

25 A Screen.

1 Q Metal screen?

2 A Right. So it's a piece of metal, very thin
3 piece of metal, that has openings. And the material
4 goes through the openings. And the metal --
5 typically, it is made by metal -- is covering all
6 the other regions of the substrate.

7 So then the material that you're trying to
8 put on to the substrate only goes to where there is
9 an opening in that screen.

10 Q It is like a stencil, right?

11 A Yeah.

12 Q Okay.

13 A Although, I do not use stencils -- like a
14 stencil like silicone printing? -- sorry -- like in
15 screen printing?

16 Q Yes.

17 A Yes, a similar thing.

18 Q But on a microscopic scale?

19 A Yeah.

20 Q Okay. So -- but I was asking about --

21 A Excuse me.

22 Q Yes.

23 A Historically, before the advent of
24 photolithography and the ability to do find
25 features, the bursting through an opening -- using

1 those screens was a standard way of putting down,
2 particularly in the laboratory -- there are
3 companies that have created products and even today
4 there are companies that sell such products for
5 making circuits and displays, but that ability --
6 that technology has limits on the size or the
7 features that you can define.

8 So you have large features that you want to
9 put metal, that is fine. But you cannot do
10 micron-sized features, or let alone submicron, with
11 that technology, because you can not etch a hole in
12 the metal so thin, because the metal will also have
13 a certain thickness that will prevent.

14 So that technology is valid for large
15 features, such as those used in making external
16 connector, like the pad, those connections to the
17 outside world is -- but in making the transistors,
18 they have certain limitations.

19 Q Okay. So I had asked you what are the
20 etching apparatuses, and you then talked about
21 additive processes and subtractive processes. Let's
22 get back to what are the etching apparatus that are
23 used in the liquid crystal display field.

24 A I can classify them in three categories --
25 actually, two categories, and one is like something

1 you would apply everywhere onto the substrate and
2 some that will be applied selectively to the
3 substrate.

4 Selectively through the substrate would be,
5 for example, using a laser ablation removing the
6 material locally. If you add something and create
7 features that will exist throughout the substrate,
8 the laser process will be very slow. So in that
9 case you use a process that will be applied to the
10 entire substrate at the same time.

11 And those processes then classify into two
12 categories also, one is called -- referred to as wet
13 processes and the other one is referred to as dry
14 processes.

15 The wet process requires chemicals, liquid
16 chemicals, and you immerse the substrate into that
17 solution.

18 And the dry processes, you have a vacuum
19 chamber and then you strike a plasma and then you
20 create reactive elements.

21 Now, between those two, there can be other
22 techniques, such as focused ion beam etching that
23 can be applied selectively -- I didn't know this
24 would be a test in microelectronic technology
25 processing, I would have studied a little bit more

1 to give you all the techniques, but, in general,
2 there is no shortage of technologies to do whatever
3 one wants to do.

4 Q Okay. And is it generally true that wet
5 etches are isotropic and dry etches are anisotropic?

6 A Well, the dry etchings can be anisotropic.
7 When you operate a plasma system in what's known as
8 the reactive ion etching mode where you use the
9 bombardment of the ions as a means to provide
10 directionality, and for that one you have to have a
11 lactate film, and that is created by biasing the
12 substrate. But the plasma process or a dry etching
13 process can also be isotropic, and that is referred
14 to plasma etching to distinguish from the reactive
15 ionating which has directionality control.

16 Q Okay. Well, how are substrates that are
17 used in LCDs put into the deposition apparatus and
18 the etching apparatuses that you've just testified
19 about?

20 MR. GIBSON: Objection; form.

21 THE WITNESS: How are they put into the
22 position of etching rub is depending upon the step
23 of the fabrication and the equipment or the process
24 used.

25 As I mentioned, there are a variety of

1 processes and a variety of technologies and the way
2 to lower the substrate into each one of them,
3 depending upon --

4 MR. MANZO: Okay. Well, I think we're at a
5 point where we need to change the video disk, so
6 let's have a short hiatus.

7 THE VIDEOGRAPHER: We are off the record.
8 The time is 2:33 p.m. on July 1st, 2013. This is
9 the end of video number 2 of the continuing
10 deposition of Dr. Milt Hatalis.

11 (Recess.)

12 THE VIDEOGRAPHER: We are on the record.
13 The time is 2:48 p.m. on July 1st, 2013. This is
14 the beginning of video number 3 of the deposition of
15 Dr. Milt Hatalis.

16 THE WITNESS: If I may correct the
17 transcripts so then maybe the same mistake will not
18 appear. In line -- page 110, line 21, it states
19 "lower the sin strate," I think it means the
20 substrate.

21 If I may finish the sentence, it depends on
22 the type of equipment, what is the type of process
23 that will be used, so there is no one weak way to do
24 that.

25 BY MR. MANZO:

1 Q Okay. In typical mass production for LCD
2 devices, after the counter-substrate is bonded to
3 the TFT substrate, are those same substrates put
4 again into a deposition apparatus or the etching
5 apparatus that you've talked about?

6 MR. GIBSON: Objection; form.

7 THE WITNESS: After the completion of MLCD
8 device and if the system performs, there is no need
9 to go back into one of those depositions or etching
10 apparatus.

11 BY MR. MANZO:

12 Q What happens if they are not -- if the
13 system is not performing properly? Can the LCD be
14 put back into the patterning or the deposition
15 apparatus or the etching apparatus?

16 MR. GIBSON: Objection; form.

17 THE WITNESS: If it's intrinsic defect in
18 the TFT array, then nothing can be done at that
19 point.

20 If it is a defect that is related to the
21 creation of the external connections, if those
22 external connections have defects, then steps can be
23 taken to correct that defect.

24 BY MR. MANZO:

25 Q How?

1 A It depends on what is the defect.

2 Q Let's say the defect is in the external
3 connections.

4 A Let's say like, for example, two of those
5 is external leads, like these wirings, let's say
6 wiring 2 that go to the adjacent pads, let's say
7 that they are shorted together, then there is a
8 repair stamp that you can go with the laser and cut
9 the metal wiring and remove that defect.

10 So it depends upon what the defect is, then
11 you choose the means to correct it, if it can be
12 corrected.

13 Q Looking at Figure 2C of Sukegawa, in your
14 paragraphs 122 and 123 of your declaration marked as
15 Exhibit 1005, is the second wiring the upper level
16 wiring 7?

17 A That's correct.

18 Q And is the transparent conductive layer 8?

19 A Correct.

20 Q Does the layer 8 cover the end of wiring 7,
21 as shown in Figure 2C?

22 A Where we are seeing cross section, we don't
23 know how 8 cover 7 in the entire planner section
24 view in Figure 2C, but looking at the cross section,
25 8 extends beyond the edge of 7 on either end.

1 Q On both ends, right?

2 A Correct.

3 Q To be more precise than saying it goes
4 beyond, it actually covers the ends that are shown
5 in the cross section of the figure; is that right?

6 A What do you mean by "ends"? The vertical
7 walls?

8 Q Yes, the vertical walls.

9 A Yes, it does.

10 Q So the top of -- so 8 resides on top of
11 layer 7. And then when layer 7 ends, 8 descends
12 vertically and then continues horizontally,
13 according to the representation of Figure 2C; is
14 that correct?

15 MR. GIBSON: Objection; form.

16 THE WITNESS: Well, as depicted in
17 Figure 2C, 8 is conformily coating 7, conformily
18 covering 7.

19 BY MR. MANZO:

20 Q Okay. So the ends of 7 that are shown in
21 Figure 2C are not exposed; is that right?

22 A In reality, that will depends upon how
23 thick is 7, how 7 has been patterned and -- and
24 whether the coverage of 8 on top of 7 is conformal
25 as the Figure 2 is shown or it is discontinuous.

1 In Figure 2C the artis shows a conformal
2 coating. And, in reality, 7 will be -- could be
3 thicker, a lot thicker, than 8. And if the walls
4 are vertical walls as patterned with the reactive
5 ionating process that we discussed earlier, there
6 may be a discontinuity from the surface of 8 on
7 layer 7 and the layer 8 which exists beyond 7. All
8 depends upon the relative thickness of the layers,
9 the means they put down, and the slope the shape of
10 that edge of 7.

11 Q What does it mean -- in the context of the
12 answer you just gave, what do you mean to conform?

13 A Conformal coating, which is the word I was
14 referring to, conformal coating is a coating that
15 covers the underlying material in all aspects, in
16 all directions, whether its horizontal or vertical.

17 So, in other words, it will cover the
18 surface and will cover the sidewalls, and then the
19 overall thickness will be independent, whether it is
20 on the upper surface or whether it is on the edges
21 of the region that is being coated.

22 You asked me, if I understand, if something
23 shown in Figure 2C will always be like that, and I
24 tried to elaborate that something is shown in
25 Figure 2C but it is an artwork and the exact shape

1 and continuity of the layers will depend on the
2 thicknesses and how you pattern it and what shape
3 you create to those edges.

4 Q Okay. Well, do you know if there is a
5 reason in Sukegawa why layer 8 goes beyond and
6 conforms to the layer 7?

7 A Layer 8 is used to protect layer 7.

8 Q Protect it from what?

9 A Protecting from corrosion, from moisture,
10 from --

11 Q Okay. So do you agree that Sukegawa does
12 not show wiring 7 extending beyond the layer 8?

13 A In this particular embodiment.

14 Q I'm sorry. In this particular embodiment
15 that's correct?

16 A Yes.

17 Q Okay. Is it incorrect for a different
18 embodiment in Sukegawa?

19 A Well, there are three layers here, there is
20 7, there is 8 and 9. And upon the order with which
21 you put those layers down and how -- what means you
22 provide for interconnecting them, one can be bigger
23 or smaller than the other one.

24 But in answer -- something else here, we're
25 referring to the Figure 2C. In the Figure 2C is the

1 connection for the scan lines. And scan lines are
2 referred to are the gate lines.

3 Q Okay.

4 A So the layer 2, the wiring 2 labeled in
5 Figure 2C --

6 Q Yes.

7 A -- will be the one that will extend from
8 this pad region all the way out to the almost other
9 end to the display.

10 In any display you have two sets of lines.
11 You have the gate lines and you have the data lines.
12 The gate lines also referred to as scan lines. And
13 the data lines also referred to as signal lines.

14 If we look at Figure 3C from Sukegawa, it
15 depicts the signal lines 7A and referred to them as
16 the data signal wiring.

17 So the data signal wiring, and you have
18 hundred such wiring, is at the level different than
19 the scan lines, and they are -- one runs almost
20 perpendicular to each other but at a different
21 level, but they are not crossing because they are at
22 a different level.

23 So the Figure 2C is a terminal connection
24 for the scan lines and, as such, the element 2 is
25 the one that will propagate to the display portion.

1 But if you -- to draw an artwork for the
2 for terminal connection for the data signal pads
3 where the data signals will receive the connections
4 from the flexible printed circuit board, it will not
5 be true that will propagate all the way across the
6 display, because then it will cross the existing
7 gate lines and will cause defects.

8 Instead, it will be 7 that it will
9 propagate across the display. And, in that case, 7
10 will be above the scan lines and it can form the
11 required data signal wiring without causing a
12 defect.

13 So in that embodiment the wiring -- the
14 transparent conductive layer 8 will not continue
15 across, because it is not shown in the Figure 3C as
16 being on top of the data signal wiring 7A. So at
17 some point that layer 8 will terminate, but the
18 material of layer 7 will continue to form the data
19 signal wiring.

20 Q Won't there be a discontinuity between the
21 portion of layer 7 shown in Figure 2C, even shown in
22 Figure 3B and the display portion?

23 MR. GIBSON: Objection; form.

24 BY MR. MANZO:

25 Q Let me rephrase the question.

1 In Figure 3C we can see portions of layer 7
2 marked as 7A, which is the data signal wiring, I
3 think you testified, we can see a 7B, which I think
4 is a drain electrode, but he can tell me if I'm
5 wrong, and we can see 7C to the left of 7B, which I
6 believe is a source electrode; is that right?

7 A Correct.

8 Q Okay. So are these connected continuously
9 to the layer 7-1 that we see in Figure 3B in the
10 terminal portion?

11 MR. GIBSON: Objection; form.

12 THE WITNESS: I think all embodiments in
13 Sukegawa are referring to the terminal connections
14 to the scan lines or gate lines. That's why it
15 shows the wiring 2, which is the first wiring, the
16 one that will continue to display portion. And it
17 can do that and forms the gate wiring.

18 So for each terminal contact, you have one
19 continuous scan line going across the display. But
20 that's on one side of the display.

21 On the other side of the display you need
22 to do the same thing, but in order to formulate the
23 connections to the data signal wiring, which are the
24 wiring 7A in Figure 3C.

25 So that wiring, 7A, continues all the way

1 up to the edge of the display.

2 BY MR. MANZO:

3 Q What happens when it gets to the sealant?

4 A It goes under the sealant.

5 Q 7 goes under the sealant?

6 A Of course. It's the wiring that formulates
7 the 7A, the data signal wiring 7A.

8 Q Is there anything in Sukegawa that says
9 that 7 goes under the sealant?

10 A Well, there is a 7 listed in Figure 2C that
11 is part of the terminal connections for the scan
12 line. And I said that these are the connections
13 that you will have in one side of the display. And
14 in the other side the display, perpendicular to that
15 side, you have another set of terminal connections
16 that will be providing connections to the data
17 signal wiring, and that will be the line 7A, and you
18 will have hundreds of those data signal wirings.

19 And the material for those wiring lines
20 will continue under the sealant and into the
21 terminal connections in order to provide -- in order
22 to receive the signal for the flexible printed
23 circuit board.

24 Q In that case, is it correct that the wiring
25 7 is not protected by layer 8 and is subject to

1 corrosion?

2 A Well, the wiring 7 will be covered by the
3 protective layer 9 and it will be under the sealant
4 and will be inside the array, so there will be no
5 means for -- to be corrected, it will be protected.

6 So the 8 will extend and cover 7 up to
7 distance. Beyond the distance, 7 will be protected
8 by other means, by 9, by the sealant or by the
9 counter glass.

10 Q Just to try to visualize this a little
11 better --

12 A If you look at APA, and there is two sets
13 of wirings.

14 Q Looking where?

15 A Okay. Look at Figure 5 of Exhibit 1001 on
16 page 5, there are two sets of wirings that extend
17 all the way up to the edge. This is the bottom edge
18 and this is the right-hand side edge.

19 The vertical ones review the data signal
20 lines and the horizontal ones, the ones on the
21 right, that terminate on the right edge, are the
22 scan lines. And those lines run across the display,
23 and the other lines run also across. So you have a
24 grid where the two lines are crossing each other at
25 multiple occasions. But because they are at

1 different levels, they did not create a short.

2 Now, in Sukegawa, the display that is
3 described is a bottom gate of silicon display. So
4 at each data signal wiring and it each gate signal
5 wiring, scan line, there will be external
6 connections for the gate lines or scan lines, they
7 will be such as those depicted in Figure 2C.

8 But for the signal lines, the data signal
9 wiring, which is going the opposite direction, the
10 layer 2 cannot extend because -- across the display,
11 because then it will cross all the horizontal lines
12 and the display will not function.

13 And in that case it will be the upper layer
14 7 that will continue and will create that wirings
15 indicated in Figure 3C as 7A.

16 Q Professor, let's visualize this whole
17 conference table that we're sitting at as substrate.
18 And the court reporter is at one end, along one side
19 and you and I are on opposite longitudinal sides and
20 your counsel is further to the left -- to your right
21 and my left. Okay? So this whole substrate has a
22 lot of different portions.

23 Now, if we come along with a layer 7, we
24 could put a little square foot of it over by the
25 court reporter, we could put a square foot over by

1 you and have a bunch of space between that and maybe
2 run some lines down the other end of the table that
3 are all disconnected from one another; is that
4 right?

5 MR. GIBSON: Objection; form.

6 THE WITNESS: Well, the portions of the
7 layer that we will put on the material -- on the
8 substrate, it will have to form -- it has to serve a
9 specific function. So one function is to create
10 this double-layer conductive structures at the
11 terminal regions. But 7 also serves another
12 function, to form the data signal wiring 7A, as
13 indicated in Figure 3C.

14 So you refer to the reporter and to me.
15 Now, one of us is going to be a data signal wiring
16 and the other one is going to be a gate signal
17 wiring or scan line wiring. Can you choose one of
18 us to be -- what do you want me to be?

19 BY MR. MANZO:

20 Q Well, I would like to figure out that
21 somewhere there is an external connection line down
22 at one end or the other end.

23 A We both extend our connection, because we
24 are both outside the display. You said the table is
25 the display.

1 Q That's right.

2 So let's say the court reporter is at the
3 right-hand side, so that is the -- did you say
4 that's the gate scan lines?

5 A Yes, that's the gate lines, scan lines.

6 Q Okay.

7 A So starting from the reporter going all the
8 way out to the screen, the other end of the table,
9 on your left or my right it will be continuous line
10 that it will start from the reporter and will
11 terminate at the other end to the display, at the
12 other end of the table, and that wiring line will be
13 made from the wiring element 2, which is the lower
14 wiring.

15 Q Okay.

16 A From my end you assigned me to be the data
17 signal wiring terminal, there will be another wiring
18 that will start from me and will terminate to you,
19 who are sitting of across from me. In other
20 words --

21 Q I understand.

22 A -- there will be a 7 going perpendicular to
23 the 2, and those wirings should not cross -- I mean,
24 can cross, but have to be at a different level.
25 Those wirings should not form -- should not touch

1 because then they will form an electrical connection
2 and then the current will flow who knows where.

3 Q You mean if they directly contact, they'll
4 be in electrical contact?

5 A Well, you see we're both at the external
6 terminals so we both receive signals.

7 Q Okay.

8 A So now we are touching and the signals will
9 be routed to who knows where.

10 Q Correct.

11 A So the current will not flow where it is
12 supposed to flow.

13 So there are two set of wirings in any
14 display, as the Figure 5 illustrates, and they run
15 across at two different levels.

16 Q They are orthogonal?

17 A Exactly.

18 Q Okay. Now, let's talk about the sealant
19 because we haven't talked about that very well -- I
20 mean enough, we haven't talked about that enough.

21 If the substrate is this table, where is
22 the sealant going to be, typically?

23 A Well, is the substrate the element 100 --

24 Q Yes.

25 A -- or the 200?

1 Q Yes, 100.

2 A And I am the terminal connections for the
3 data wiring.

4 Q Same arrangement as before. That's the
5 gate lines down there and --

6 A Okay. The sealant will be placed --
7 based on information disclosed, someone skilled in
8 the art will understand to place the sealant where
9 the element 13 stops, so in this case it will be
10 right where -- the two metals still overlap, the two
11 wirings, 8 and 2 -- or 7 and 2 overlap, that's where
12 you place the sealant.

13 Q Does Sukegawa say that anywhere, that the
14 sealant overlies both 7 and 2?

15 A Sukegawa doesn't say it explicitly. It
16 shows that to that figure that we referred earlier,
17 3D. And if you take the relative dimensions of the
18 element 10 and if you take the relative dimensions
19 of the gap form between where 10 ends to the left
20 and 200 starts further in, then you will see that
21 that vertical edge of 200 where it will overlap with
22 the sealant will be placed at the -- where that
23 numeral 8 is listed adjacent to element 13. But --

24 Q Numeral 8 in what figure?

25 A 2C. I thought we were referring to

1 Figure 2C.

2 And the relations between the sealant and
3 the silicon layer 13 is explicitly shown in the
4 other piece of prior art that I'm referring in my
5 declaration.

6 Q Is that Nakamoto?

7 A Nakamoto, correct.

8 Q Let's talk about Nakamoto in a minute.

9 Could you look at Figure 3A of Sukegawa,
10 please.

11 What does that represent, just by way of a
12 general statement of what it is?

13 A It is the artwork for the layout for the
14 mask set that is used to pattern the different
15 elements that are used to formulate that particular
16 embodiment.

17 Q Okay. So this is a representation of the
18 mask set for what ends up being shown on Figure 3E;
19 is that right?

20 A Yes, 3E -- and shown in 3B, they are the
21 same.

22 Q Okay. Now, does that Figure 3A show us
23 that the region -- sorry -- show us the regions 7-1
24 and 7-2? Are they delineated in Figure 3A?

25 MR. GIBSON: Objection; form.

1 THE WITNESS: What do you mean by
2 "delineated"? Are they shown?

3 BY MR. MANZO:

4 Q Yes, are they shown? Perhaps my question
5 was unclear.

6 What is -- in Figure 3A, what is the region
7 7-1? You say it is a rectangle on the left side.
8 What does that mean?

9 A Well, it is the portions of the layer 7
10 that remain in that location.

11 Q Okay. So does that mean that 7-1 is inside
12 that rectangle that has the 7-1 attached to it?

13 A Well, the external -- are you talking about
14 the rectangle labeled 7-1?

15 Q I am.

16 A All right. That rectangle defines the area
17 where the layer 7 will be within.

18 Q Okay. I mean, that corresponds to Figure
19 3B which is the sectional view, yes?

20 A Sectional view, correct.

21 Q Okay. And in the same way, does 7-2 in
22 Figure 3A delineate the region where layer 7-2 is
23 going to be within?

24 A In that particular embodiment, correct.

25 Q Okay. So according to Figure 3A, this part

1 of layer 7 does not extend further to the left; is
2 that correct?

3 A No, layer 2-2 is the one that extends.

4 Q Layer 2 is the one that extends, but not 7,
5 right?

6 A That's what I said, that this is the
7 terminal connection for the scan line wiring and not
8 the terminal connections for the data signal wiring.

9 Q Now, do you see the outermost rectangle in
10 Figure 3A, do you see that that's labeled with the
11 number 8?

12 A Correct.

13 Q Does that mean that the conductive oxide
14 layer overlies both region 7-1 and 7-2 to the extent
15 shown in Figure 3A?

16 A In this particular embodiment, yes. But --
17 yeah.

18 Q Now, you mentioned -- strike that.

19 A If I may add, Figure 3A is not the one, or
20 3B is not the embodiment that I have used in my
21 declaration, just to make the record clear.

22 Q I didn't understand.

23 A You are referring to the Figures 3A, B and
24 Figure 3E in our discussions a few moments ago?

25 Q Yes.

1 A And I said that's one embodiment that I did
2 not use in my declaration --

3 Q Okay.

4 A -- just clarifying the record.

5 Q You did not use Figure 3A and Figure 3B?

6 A That's a different embodiment than I have
7 utilized -- that I utilized.

8 Q So which embodiment did you use?

9 A I used the embodiment in Figure 2C.

10 Q Very well.

11 Is it correct that in Sukegawa the first
12 wiring, 2, and the second wiring, 7, contact each
13 other outside the sealant in order to make a secure
14 corrosion-resistant local connection to the flexible
15 wiring substrate, 31?

16 MR. GIBSON: Objection; form.

17 THE WITNESS: You defended your question as
18 contact outside the sealant, and I believe in my
19 testimony a few minutes ago I placed the -- I placed
20 the sealant in a location that overlaps the two --
21 both wirings.

22 You're right, that the contacts where the
23 two regions are touching each other through those
24 holes labeled 6 is depicted in E, Figure --

25 BY MR. MANZO:

1 Q 1A and 2B?

2 A Those contact holes in that particular
3 embodiment are outside the sealant, because they are
4 located in the region that either overlaps the
5 flexible printed circuit board or that testing
6 region, which is below the silicon layer 13.

7 But the sealant does provide some corrosion
8 protection because I think in your statement you
9 refer to -- also to corrosion protection. And the
10 sealant also protects the -- whatever is
11 overlapping --

12 Q Referring to Figure 2C, could be tell me
13 where the sealant is relative to reference numeral
14 13 and reference numeral 8, please?

15 A The Figure 2C in view of the prior art
16 Nakamoto, someone skilled in the art and in view of
17 the figure, Figure 3D, the sealant will be next to
18 13 and the two will touch each other.

19 Q Can you point, just point where the sealant
20 is going to be, please.

21 A Well, the sealant is a very wide region, so
22 the start of it will be here, and then it will
23 extend from -- we're on opposite sides, so it will
24 extend to my right, to this direction, over hundreds
25 of microns.

1 Q Okay. So on Exhibit 2 -- what is this
2 number? 2010? Could you please mark on Exhibit
3 2010 with this red pen where you believe the sealant
4 would go based on your testimony?

5 A I'm marking Exhibit 2010, the location of
6 the sealant based on the information disclosed in
7 Sukegawa and in view of the prior art Nakamoto?

8 Q Yes, that's my question.

9 And you marked in red -- I think you put
10 the letters SL for sealant; is that it?

11 A Yes.

12 Q Okay.

13 A And, of course, this indicate the sealant
14 will continue.

15 Q Yes, I -- that's what your arrow indicates,
16 correct?

17 A Correct.

18 And you can see that the relationship
19 clearly in the prior art labeled "Nakamoto" referred
20 in my declaration.

21 Q We're going to turn to that pretty shortly.

22 A I also want to clarify in this -- in this
23 point that once we are next to 13, wherever area
24 remains, if it is not covered by the sealant, it is
25 an area that will be totally wasted on the display.

1 It is an area that will be adding to the overall
2 dimensions of the display without having any
3 functional purpose. It will add to the entire
4 length of lines, which will increase the resistance.
5 So from both the physical dimension size, it will be
6 undesirable from the electro-performance point of
7 view, it will also be undesirable, so the motivation
8 to reduce the size of the display in order to either
9 maximize the viewing portion or to be able to
10 fabricate more displays per mother glass.

11 Typically a display is fabricated onto a
12 larger piece of glass that contains a plurality of
13 displays. And then that larger piece of glass has
14 been separated to the individual displays.

15 And if there is an extra dead region on the
16 periphery of the display that serves no purpose, it
17 will increase the cost, it will degrade the
18 performance and it will not be desirable from the
19 consumer point of view because it will increase the
20 border around the display.

21 Q Professor, is it your testimony that the
22 person of ordinary skill in the relevant art would
23 have understood these things in 1997?

24 A The issues of cost and performance was
25 pervasive and was well known in the field since the

1 beginning of the industry, because there was a lot
2 of competition between companies, so ability to put
3 more glasses or ability to design -- put more
4 displays per mother glass or the ability to
5 fabricate larger displays was from the onset of the
6 industry. People raced to fabricate bigger, cheaper
7 displays. So minimizing the area around the
8 periphery of the display was something that was well
9 known.

10 Q How do you spell that -- how do you spell
11 that?

12 A Mother.

13 Q Mother, like mother/father?

14 A Yes.

15 Q Okay. The mother glass?

16 A Yes, two words, that's what it is. People
17 refer the bigger substrate, the bigger glass
18 substrate on top of which you fabricate the many
19 individual displays. But they become individual
20 displays once you scribe and separate them from the
21 mother glass.

22 Q I'm handing you a copy of Exhibit 1004.

23 A Before we go into lengthy discussion, may I
24 have a two-minute break?

25 Q Yes.

1 THE VIDEOGRAPHER: We are off the record.
2 The time is 3:41 p.m.

3 (Recess.)

4 THE VIDEOGRAPHER: We are back on the
5 record, the time is 3:50 p.m.

6 BY MR. MANZO:

7 Q Professor Hatalis, you mentioned several
8 times your view of Sukegawa in view of Nakamoto,
9 right?

10 A For the placement of the sealant.

11 Q Okay. Can you show us in any of the
12 figures of Nakamoto where that sealant goes?

13 A You can see, for example, in Figure 9,
14 which it shows a cross section and it indicates the
15 terminal region and it shows the silicon layer,
16 which is similar to the element 13 in Sukegawa.

17 And you see that the silicon layer is
18 physically touching the sealant between the two
19 opposing glass substrates, substrate 1 and substrate
20 2, as indicated in Figure 9 of Nakamoto was sub 1
21 and sub 2.

22 Q The silicone resin, is that marked SIL?

23 A The silicon, yes.

24 Q And it looks -- is the sealant marked SL?

25 A In the specification referring to both SL

1 and EPX, which is epoxy resin, they are both used
2 for sealant.

3 Q Does Figure 5 show a sealant SL from a plan
4 view?

5 A It does.

6 Q And do we see a -- actually just a corner
7 of the sealant; in other words, we have a portion of
8 the sealant that goes from about the middle of the
9 drawing towards the right and a portion that goes
10 from that same middle of the drawing straight down;
11 is that right?

12 A Yes. That's the part of the sealant
13 labeled SL in Figure 9 --

14 Q Okay.

15 A -- in the cross section of Figure 9.

16 Q Now, I think that you testified that --
17 well, let's put it another way.

18 In section 100 of your declaration -- why
19 don't we turn to that paragraph 100, where you show
20 Figure 9 and Figure 5 together.

21 In that paragraph 100 -- and, by the way,
22 Counsel, we are still waiting to receive a color
23 copy of this colored exhibit. We've not received
24 one yet.

25 If you have one around, we'd love to --

1 MR. GIBSON: I wasn't aware that you had
2 requested it, but I will check at the next break.

3 MR. MANZO: I appreciate it very much. We
4 did make that request. Mr. Murphy requested it of
5 Scott McKeown.

6 MR. GIBSON: Okay. I wasn't aware of it
7 until just now, but I will be happy to take a look
8 and see if I can find it.

9 MR. MANZO: That will be superb.

10 Q Sorry for that limna.

11 In Figure 5, as shown on page 6 of your
12 Exhibit 1005, there's two ovals with arrows pointing
13 to them, which I suppose were colored.

14 Do you see those two?

15 A Yes.

16 Q What do those represent, please?

17 A Well, Nakamoto is describing an accumetrics
18 liquid crystal display and described means to make
19 electrical connections to a flexible printed circuit
20 board -- to a flexible circuit board, which is
21 placed at the terminal regions.

22 So as you see in Figure 5, there are
23 wirings that start from the edge of the array, which
24 is the element labeled "AR," and that wiring goes
25 into the horizontal directions and terminate in the

1 terminal labeled as GTM.

2 And there's wiring that start from the
3 vertical/horizontal end of the array and terminate
4 in the upper end of the corner of the figure and
5 form the data terminals, referred to as DTM.

6 That wiring, one of them is for the gate
7 lines. The GPM refer to the gate lines and the DTMs
8 refer to the data lines. That wiring cross under
9 the sealant. And those circles and Rs indicate the
10 location where that wiring is crossing under the
11 sealant.

12 Q Now, you say in paragraph 101 the
13 following, quote -- and I'm starting with the second
14 sentence of paragraph 101 -- as Sukegawa explains
15 that its LCD panel includes a sealing material, and
16 Nakamoto shows that the placement of the sealant
17 near close to the connection to the tape carrier
18 package was known, and also that the placement of
19 the sealant over the first and second wirings that
20 extend outside the sealant was known, it would have
21 taken only ordinary skill to include a configuration
22 having the sealant over the first and second
23 wirings, closed quote.

24 Did I read it correctly?

25 A Yes, you read from what's in paragraph 101.

1 Q Okay. Is there any disclosure here about
2 the claimed first region or second region that are
3 in the claims of the '413 patent being challenged?

4 MR. GIBSON: Objection; form.

5 THE WITNESS: I don't understand your
6 question. What do you mean?

7 BY MR. MANZO:

8 Q Well, okay. If you look at the first
9 para- -- the first sentence of section X1 or
10 paragraph 101, it talks about a sealant over the
11 first wiring and a second region of the second
12 wiring.

13 A And that's a claimed feature of the '413.

14 Q Yes. That's what I'm asking about.

15 I don't understand how -- let me put it
16 another way.

17 It seems to me that the ending of paragraph
18 101 is a non sequitur, and I'm asking you why that
19 is wrong. I don't see anything in the ending of
20 section 101 1 that tells me anything about the
21 second region.

22 Did I miss it?

23 A In my declaration I have performed an
24 analysis of Sukegawa and I have identified the first
25 region and the second region of the second wiring,

1 and I have identified the first wiring also.

2 I did not perform -- at least I did not
3 disclose -- I did not describe it in my declaration
4 a similar analysis of Nakamoto to identify the exact
5 first wiring and second wiring and the first and
6 second regions of the second wiring.

7 I referred to the first and second regions,
8 the second wiring, with respect to Sukegawa and the
9 first wiring also with respect to Sukegawa. And I
10 used Nakamoto in order to indicate the placement of
11 the sealant over wiring that was used in Nakamoto,
12 which is as many of the features and of the first
13 and second wirings in '413.

14 Q Okay. Well, where are the first wirings
15 and the second wirings in Nakamoto?

16 MR. GIBSON: Objection; form.

17 BY MR. MANZO:

18 Q Okay. Are there first wirings and second
19 wirings in Nakamoto Figure 5?

20 A You want me to perform an analysis and show
21 you where the first wiring is in Nakamoto?

22 Q Yes, please.

23 A First let me say I didn't perform this
24 analysis because I didn't thought it was required
25 since I have identified those elements already in

1 Sukegawa.

2 If you want me to identify where is the
3 first wiring and how that first wiring is meeting
4 the claims of '413, I can do that.

5 Do you want me to do that?

6 Q Will that take long?

7 A No.

8 Q A minute or two?

9 A Yeah.

10 Q Go ahead, please.

11 A The first wiring in Nakamoto is the
12 portion -- of the wiring made by the scan line
13 material. And the scan line material is referred in
14 the Figure 4 as G2.

15 Do you see element G2 in Figure 4?

16 Q Not yet.

17 A It is the gate, the bottom gate to the
18 transistor.

19 Q Can you point?

20 A It says "GT," "G2" next to it.

21 Q Is that what it says? Okay. I see a GT.

22 A And next to the small letters is G2.

23 Q That's too small for me to read. I
24 apologize. I see something that looks like a 9 and
25 a 2?

1 A If we refer to --

2 MR. GIBSON: The letter G looks a lot like
3 a 9.

4 THE WITNESS: There is a reference in --
5 I'll read for you. That's the -- I'm sorry.

6 BY MR. MANZO:

7 Q I don't need a reference. That's okay.

8 So that's the first wiring?

9 A Well, the first wiring is the wiring that
10 forms onto the substrate, over the substrate is the
11 very first wiring. And the first wiring form over
12 the substrate is the wiring that is formulated by
13 the material of the scan lines.

14 Q Okay. So is there a second wiring over
15 that somewhere?

16 A Okay. For example, look at the prior art
17 70, it says, "The gate dielectric G2 are formed in
18 the single layer of the second conductive electric
19 film g2," with small g, "for example, the aluminum
20 fill on the sputterer."

21 So the first wiring is made by aluminum
22 going to, according to paragraph 70, which is the
23 first metal layer that is put down over the
24 substrate. And in between the substrate and the
25 first metal layer you have the element SIO, which is

1 an insulating, coated, an oxide, silicon oxide
2 coating.

3 Now, this wiring in the horizontal
4 direction continues all the way out to the end,
5 continuous line starts from the one end of the
6 display and propagate all the way out to the other
7 end of the display. These lines are form the scan
8 lines, the horizontal scan lines. Okay?

9 Q You are pointing to figure what? Figure 5?

10 A Figure 5. The gate lines of the scan lines
11 are the horizontal lines, because these are the gate
12 terminals.

13 Q That are marked GTM?

14 A GTM are the gate terminals.

15 Q Okay.

16 A Now the material, the aluminum material, is
17 used in Nakamoto to form these successive continuous
18 horizontal lines that go across the display and
19 there are hundreds of those lines.

20 Q Where?

21 A Those lines continue all the way across the
22 display, like all across the table. All right?
23 These are the scan lines. Okay?

24 Q I think so. I think I'm following you.

25 A That material that is used to make these

1 lines, the aluminum material that is used to make
2 these lines, is also used to form wiring that are
3 going in the data terminals.

4 So somewhere above the first gate line and
5 the horizontal lines, which is labeled as "GI" --
6 you see a line labeled GI?

7 The GI has a vertical line and horizontal
8 line.

9 Q Yes, that's the gate insulator, I think?

10 A That's the gate insulator.

11 That GI, inside of it the gate insulator
12 remains, and outside of it the gate insulator is
13 removed and create an opening in the gate insulator.

14 So somewhere between the boundary line
15 called GI, the horizontal boundary line GI, and the
16 first horizontal gate line will be the start of a
17 vertical line that is made by aluminum, which is the
18 same aluminum as that used to fabricate the
19 horizontal scan lines. And that material goes all
20 the way out to the terminal regions, DTM.

21 So these are individual lines, which that
22 go all the way out to the end, the top end.

23 Q And are all of these the first wiring?

24 A I'm describing it.

25 Q Thank you.

1 A And that portion made with the aluminum,
2 which is used in forming the wiring for the DTMs,
3 okay, it can be seen in the cross section in the
4 Figure 9, and that is the element labeled G1.

5 Do you see G1? There is a G1 and D1.

6 Q I see them?

7 A G1 is the layer right above the SIO layer,
8 which is, as we said a moment ago, is the insulating
9 oxide above the substrate sub 1.

10 Q So G1 is a first wiring?

11 A So G1 is a first wiring made of aluminum,
12 and that one overlaps another wiring. And that
13 other wiring -- do you see the other wiring by the
14 double layer D2, D3.

15 D2, according to the specifications, is a
16 chrome layer and D3 is an aluminum layer, if I'm not
17 mistaken.

18 And those two layers are in electrical
19 contact because the GI layer has been removed. So
20 in this region here you have both the G1 layer below
21 and you have the D2 and D3 layers above it. And in
22 this region, GI, which is the gate insulating layer,
23 does not exist.

24 Q That's in the display area, yes?

25 A No. This is right above the display area.

1 The display is what is known as AR.

2 Q Okay.

3 A AR is the display area --

4 Q I'm --

5 A -- and outside that area called as AR, you
6 have the wiring leading to the terminal regions.

7 Q Okay. So perhaps I misspoke. What you're
8 pointing to is inside the sealant region, not under
9 the sealant region but in the interior to be marked
10 by the sealant region, SL?

11 A The double wiring -- the double wiring
12 starts from inside the sealant region and extends
13 under the sealant region and you can see -- maybe
14 not clearly, you have to zoom out and magnify the
15 pictures, but the D2, D3 extend below the sealant.
16 So the power combination of D2, D3 is overlapping G1
17 inside the sealant and also under the sealant.

18 Q Professor, as best as I can make out,
19 neither D3 nor D2 goes all the way under the sealant
20 in Figure 9.

21 A They go partly under the sealant.

22 Q And they both terminate there, is that what
23 you see?

24 A Right, they terminate -- let me see exactly
25 where they terminate. They terminate under the

1 sealant.

2 Q So those conductive lines, G1, D2 and D3,
3 among those is it true that only G1 goes all the way
4 under the sealant from the terminal portion into the
5 region inside --

6 A That's correct.

7 Q -- of the sealant?

8 When I say "inside the sealant," I don't
9 mean in the sealant itself, but I mean in the
10 portion of the LCD demarked by the sealant?

11 A That is correct.

12 G1 is the layer that extends all the way
13 outside. G1 is the one that extends from inside the
14 sealant all the way out to outside of the sealant.

15 Q And that's shown in Figure 9, yes?

16 A And that's shown in Figure 9, correct.

17 Q Okay.

18 A So as you see here, the two wirings overlap
19 under the sealant, they overlap between them, they
20 have an electrical contact or electrical connection
21 that goes through an opening in the insulating layer
22 GI. So they show many of the features of the first
23 and second wiring discussed in the '413.

24 Q Okay. Now, in your section paragraph 101
25 you reach the conclusion that only ordinary skill is

1 needed to have a configuration with sealant over the
2 first and second wirings, but it seems to me that in
3 this paragraph you do not express an opinion about
4 whether the sealant is over a second region of the
5 second wiring. Am I correct that that's not in the
6 declaration?

7 A Well, the declaration identify the first
8 and second regions and identify the first wiring in
9 Sukegawa, so in my declaration I did not try to
10 identify all of these region in Sukegawa. I draw
11 the analogy between the wirings in Sukegawa and the
12 wirings in -- the wirings in Nakamoto and the
13 wirings in Sukegawa and the elements of the claims
14 in '413 to -- to show that between the two pieces of
15 art, in Sukegawa and Nakamoto, it was well known in
16 the art where the sealant is relative to the wirings
17 that leads to the terminal portions, and so it would
18 take ordinary skill in the art to configure the
19 wirings with the placement of the sealant, as
20 indicated in Nakamoto.

21 As I spent several minutes describing to
22 you, the wirings in Nakamoto have many similarities
23 and serve many of the -- meet many of the
24 limitations of the '413, so it is different wirings
25 or something, is not related. They are both in

1 liquid crystal displays and they both are double
2 layer wirings to reduce resistance. And I didn't go
3 into a discussion, but if you look at the terminal
4 region, you will see that above G1 you have D1. And
5 D1, according to the specification, is a transparent
6 display, D1.

7 Q And that's what?

8 A And that's transparent conductive layer.
9 And as you see in the prior art of Nakamoto, the
10 transparent conductive layer is the upper layer
11 exposed in the terminal regions, and that is because
12 it was well known that ITO provides protection
13 against corrosion.

14 So you see in Nakamoto you have a
15 double-layer line to create -- to reduce resistance
16 and you have ITO to improve the liability and
17 reduced corrosion.

18 Q Can you point out where it says what D1 is
19 in Nakamoto? Do you have that handy?

20 A It will take me a minute or two. If I look
21 through the pages here.

22 Okay. If you refer to page 25 in paragraph
23 80.

24 Q Yes, paragraph 80 says that G1 is a
25 transparent conductor film.

1 A In the translation.

2 Q In the translation, yes.

3 A But if you turn to the original paragraph
4 80 of the Japanese version.

5 Q I'll be happy to do that.

6 Okay. Paragraph 80?

7 A If you forget all the Japanese and you just
8 focus only on the English and the Latin character,
9 you will see that the layer referred here is D1 and
10 not as G1. So the G1 in the translation is a typo,
11 it should be referred as D1.

12 Also, if you look in the Figure 4 and you
13 look at the pixel active layer ITO 1, D1, right
14 here, ITO 1, corner D1.

15 Q I see that.

16 A And that is referring to the pixel
17 electrode region.

18 Q In the '413 patent claims where they call
19 for a first region, do you understand that the first
20 region is where the transparent conductive layer and
21 the flexible printed circuit are both located over
22 the second wiring?

23 MR. GIBSON: Objection; form.

24 BY MR. MANZO:

25 Q Professor, I'm just referring to features 6

1 and 7 of claim 1, for example.

2 Feature 6 says, "a transparent conductive
3 layer over a first region of the second wiring," and
4 next element says, "the flexible printed circuit
5 over the first wiring and the first region of the
6 second wiring."

7 So my question is: Do you understand that
8 the first region has both the transparent conductive
9 layer and the flexible printed circuit located over
10 the second wiring?

11 A Correct.

12 Q Is that the case in Nakamoto?

13 A As I said, I did not rely on Nakamoto to
14 identify the first and second region omitting all
15 the claim limitations of the '413. I rely on
16 Sukegawa to do that. I rely on Nakamoto to indicate
17 the placement of the sealant over the wirings and
18 through the discussions that we have for quite some
19 time. And as I went into detail to describe certain
20 elements of Nakamoto, there are many of the
21 limitations listed in the claims are met in the
22 wirings described in Nakamoto.

23 So the wirings in Nakamoto and the wirings
24 in Sukegawa are related. They have many
25 commonalities, many features.

1 The ones in Sukegawa meet all the claim
2 limitations as required under patent law, so I used
3 Nakamoto to indicate the placement of the sealant
4 for that wiring.

5 Q Well, referring to your declaration,
6 Exhibit 1005, can you point out somewhere beginning
7 on page 32, paragraph 89, or thereafter, telling us
8 or showing us where your declaration tells us what
9 the first region is in Sukegawa or Nakamoto?

10 A I put my papers here in order so I will not
11 get lost.

12 Q If you give me the exhibit, I'll put it in
13 order and staple it for you while you look at your
14 declaration.

15 A In my declaration I went to the different
16 limitations of the different claims and I compared
17 to the different elements found in the prior art and
18 I explore an opinion where there is a difference
19 where those elements are similar. I think it is
20 the -- the point-by-point analysis that you're
21 asking me too, that was something that was done in
22 the claim charts, and I have advised the attorneys
23 in the creation of the claim charts and identified
24 specifically each claim limitation for each -- for
25 each limitation of each claim.

1 So I have contributed in the claim charts.
2 In my declaration, I did not do this point-by-point
3 analysis as you present that level much detail in
4 the claim charts, but I consider those two to be --
5 the claim charts to base on the opinion I express in
6 my declaration regarding those different regions or
7 different elements.

8 Q Okay. So I understand your testimony to
9 mean that your declaration, Exhibit 1005, does not
10 explicitly tell us where the first region is for
11 claim 1 in any of the prior art, but we can find it
12 in the petition. Is that a correct conclusion from
13 what you've just told me?

14 MR. GIBSON: Objection; form.

15 THE WITNESS: I said, in general, I grouped
16 the claim limita- -- many of the claim limitations
17 appear over and over in multiple claims. I group
18 wherever is possible some of those limitations and
19 I've expressed an opinion. If you wonder how those
20 are related to the prior art, I can spend a minute
21 to review my declaration to see how -- to what
22 extent the first region is identified and described
23 in my declaration.

24 BY MR. MANZO:

25 Q Yes, I would very much appreciate that.

1 And, of course, I think we're focusing on section X,
2 Roman numeral X, but I'm not going to restrict your
3 inquiry.

4 Section X is the one that begins at page 32
5 for the combination of Sukegawa in view of Nakamoto.
6 But look wherever you want.

7 A So looking at paragraph 96 -- actually, 95
8 and 96. And 95, at least of the limitation which
9 appears in multiple claims, quote, "the flexible
10 printed circuit over the first wiring and first
11 region of the second wiring," so the first region of
12 the second wiring is the part of the second wiring
13 which is below the flexible printed circuit.

14 So in paragraph 96 I read -- I write,
15 "Sukegawa explains that in the multilayer wiring
16 structure for providing an external connection,
17 including a flexible printed circuit over the first
18 wiring and the first region of the second wiring was
19 a known method to provide connectivity. See
20 Figure 2C, showing a flexible printed circuit
21 (flexible wiring substrate 31) over the first wiring
22 (lower layer metal wiring 2) and the first region of
23 the second wiring (upper layer metal wiring 7)."

24 So shown in Figure 2C the part of the upper
25 layer wiring 7 that is below the flexible printed

1 circuit is defining in the first region of the
2 second wiring.

3 And in an earlier paragraph I have
4 identified the 7 as the first -- the second wiring.

5 Q Only. That answers my question. Thank
6 you.

7 Now, going back to Nakamoto, you've said
8 that D1 is a transparent conductive layer of ITO, I
9 think?

10 A No, that is what the specification,
11 Nakamoto state.

12 Q And you referred us back to the Japanese
13 text.

14 Do you read Japanese?

15 A No, I don't. I look at the Figure 4 that
16 it referred to the -- to the ITO 1, which is the
17 pixel electrode, and I saw it was labeled as D1.

18 And then in paragraph 8 it talks about a
19 transparent pixel electrode ITO 1, and in this
20 paragraph it is referred to as G1. And that is in
21 contrast to whatever is in Figure 4 where ITO 1 is
22 also labeled as D1. So I thought maybe that is a
23 typo, so that's why I turn to the Japanese version
24 to see in the Latin characters are used in the
25 proper sequence, and that's how the mistake. I do

1 not claim that I read Japanese or knowledgeable.

2 Q I understand.

3 A Or have any sort of language of that
4 language -- any sort of knowledge of that language.

5 Q I understand.

6 Do you agree that D1 is not an insulator,
7 then; is that correct?

8 A D1 is ITO, transparent conductive layer,
9 that's a conductive layer.

10 Q Which means it is not an insulator?

11 A Correct.

12 Q And in Figure 9, are D1 and/or G1 the
13 external connecting lines?

14 A Well, the '413 does not refer to them as
15 external connecting lines, and I think the '204
16 patent connects them as external connecting lines.

17 Q Okay. Well, they may be referred to that
18 way in the claims, but in the figure there is a
19 label that says "external connection lines, 403."
20 I'm just wondering if there are external connection
21 lines in Figure 9 of Nakamoto. And, if there are,
22 what are they labeled?

23 A Since you refer to the external connection
24 lines, may I also refer you to column 9 on the '413,
25 line 47. So it reads, "In the present embodiment,

1 the auxiliary lines and external connection lines
2 may be replaced with each other to use the lines
3 provided in the layer under the first inter-layer
4 film as external connection lines which establish
5 electrical connections with the EPC."

6 So you see here that paragraph, column 9,
7 lines 47 to 51, is covering what is depicted in
8 Figure 9 of Nakamoto where the external connection
9 line is the lower line.

10 So in view of the specifications of the
11 '413, Nakamoto Figure 9 is relevant.

12 Q And how is the external connection line
13 labeled?

14 MR. GIBSON: Objection; form.

15 MR. MANZO: Strike that.

16 Q Does Figure 9 show an external connection
17 line?

18 A Figure 9 and all the other figures that we
19 discussed in Nakamoto, they describe wirings that
20 connect the gate lines and data lines to the
21 terminal regions. And I tried to present the
22 similarities of those lines to the specifications
23 and to the claims discussed in '413.

24 I've not performed the analysis in order to
25 meet all the claim limitations in Nakamoto and I'm

1 just pointing out some features of those lines.

2 Q Okay. Would you agree with me, Professor,
3 that looking at Figure 9 there is no insulation
4 between D2 and D3?

5 A D2, D3 are formed sequentially, as one is a
6 chrome and the other is aluminum. The combined
7 double layer is forming a wiring.

8 Q Okay. And is there any insulation between
9 D1 and D2 in Figure 9?

10 A Between D1 and D2? No.

11 Q In the region of the sealant in Figure 9,
12 is the first insulator that is above D1 labeled as
13 PSV1?

14 A That is correct. For the portions of where
15 PSV1 overlaps D1, there are portions of D1 that are
16 covered by the D2 and D3, and those are intermediate
17 layers before PSV1.

18 Q Would you agree that in Figure 9 there is
19 no second wiring that extends across the sealant
20 from a region to a region on one side of the sealant
21 to a region on one side of the sealant to a region
22 on the opposite side of the sealant?

23 MR. GIBSON: Objection; form.

24 THE WITNESS: You are using a different
25 terms from the claims and sometimes you are using

1 terms from the specifications.

2 As I said a moment ago, I did not try to
3 identify all the elements of the claims in Nakamoto.
4 I described the series of such elements and how they
5 are meeting the specifications. I did not do the
6 analysis to find all those limitations.

7 BY MR. MANZO:

8 Q Very well.

9 This is a good time for changing the video
10 disk.

11 THE VIDEOGRAPHER: We are off the record.
12 The time is 4:55 p.m. on July 1st, 2013. This is
13 the end of video number 3 of the continuing
14 deposition of Dr. Milt Hatalis.

15 (Recess.)

16 THE VIDEOGRAPHER: We are back on the
17 record. The time is 5:13 p.m. on July 1st, 2013.
18 This is the beginning of video number 4 of the
19 deposition of Dr. Milt Hatalis.

20 BY MR. MANZO:

21 Q Professor, if you look at paragraph 99 of
22 your declaration marked as Exhibit 1005, you'll see
23 on the third line that you referred to a, quote,
24 more secure connection, closed quote.

25 Does Sukegawa actually say that or is that

1 your characterization?

2 A Give me a moment, please.

3 Q Certainly.

4 A If we look at Sukegawa in the column 6,
5 line 61, continuing to column 7, line 8, it
6 describes the double-layer wiring, and it shows
7 since -- presents that the double-layer wiring, when
8 have you multiple holes 6, element 6, that is made
9 less peeling, p-e-e-l-i-n-g. So there is less
10 peeling if you have a double-layer line, that
11 means -- and that I what I mean by making a
12 connection which is more secure, it is more
13 resistance to peeling.

14 Q Are you referring to covering the top metal
15 wiring 7 with the layer 8 of ITO or the film 9 or
16 are you referring to the lower wiring 2?

17 MR. GIBSON: Objection; form.

18 BY MR. MANZO:

19 Q With regard to your explanation of making a
20 more secure connection.

21 A Well, the peeling connection I refer to is
22 one example where Sukegawa talks about more secure
23 connection. And that was when you having the layer
24 7 anchored to layer 2 through the holes 6.

25 If you're referring to the double layer

1 between 7 and 8, there is another section in
2 Sukegawa, and that is in column 1, line 28, and it
3 reads, "In such a structure, the terminal portion
4 for connection is made of a metal wiring layer
5 covered with a chemically stable transparent
6 conductive film."

7 So in this section it discuss the advantage
8 of having transparent conductive layer, which is a
9 chemically stable layer, so the secure connection
10 applies to multiple double-layer wiring elements, so
11 depending upon which one you're referring to.

12 But in any case, Sukegawa discussed those
13 advantages. They are not my conclusions.

14 Q Well, in paragraph 99, the first line, you
15 refer to a multilayer wiring structure. So what is
16 the multilayer wiring structure that you referred to
17 at that part of your declaration?

18 A The multilayer wiring structure that starts
19 from the wiring 2, includes the wiring 7 and
20 includes the wiring 8.

21 So in that section 2 and 7, it create two
22 parallel lines that reduce resistance, and to a
23 lesser extent 8 can also contribute to the overall
24 lateral reduction of resistance. 2 further serves
25 to fasten 7 down to make it more resistant for

1 peeling and 8 serves to provide a protection against
2 corrosion.

3 Two parallel lines instead of patterned
4 alliance -- page 161, line 7, to create two parallel
5 lines.

6 MR. MANZO: The professor is saying that
7 you've got -- the rough transcript says "pattern
8 alliance," and he was saying "parallel lines."

9 Q So, Professor, it's correct, I take it,
10 that in Sukegawa layer 8, or film 8, is only in the
11 terminal region; is that correct?

12 MR. GIBSON: Objection; form.

13 BY MR. MANZO:

14 Q Well, maybe I can restate that.

15 Professor, in Sukegawa is the layer 8
16 located in only the terminal region?

17 A What do you mean by "terminal region"?

18 Q Well, if I look at Figure 1B, if you look
19 at the bottom left part of it, there is an arrow
20 pointing upwards and under the arrowhead there is
21 the legend "for display portion." And that same
22 indication is found in Figure 3B and 3E.

23 Do you see that?

24 A I see that.

25 Q So I understand there is a terminal portion

1 and a display portion. Is that understanding
2 correct?

3 A What it referred to as display portion, it
4 refers to the area where you have the scan lines and
5 the data signal lines and also you have the pixel
6 electrodes. So you have multiple wirings at
7 different levels. So not all elements shown in the
8 Figures 1B can extend to the display portion because
9 they will make shorts to connections -- they will be
10 touching other metal lines, and that will lead to a
11 malfunctioning of the display.

12 Whereas the terminal portion that you refer
13 is typically referred to a region outside the
14 sealant. And, as we discussed earlier, again, the
15 sealant is also someone skilled in the art, the
16 portions of the structures shown in Figure 2C.

17 Q So can we agree that this structure 8
18 extends in -- does not extend in the display
19 portion?

20 MR. GIBSON: Objection; form.

21 THE WITNESS: The only element of those
22 three layers, 7, 8 and 2, that can extend to the
23 display portion is the element that will be used to
24 form the wiring for that particular element. For
25 example, if it is -- if we're going to have the scan

1 line wiring, then only element 2 can extend. If
2 we're going to have the data signal wiring, then
3 only 7 can extend all the way to the display
4 portion.

5 They can extend under the sealant, but
6 cannot interfere with the actual pixel electrodes or
7 with the data scan lines that's there, unless the
8 material which extends all across is the same
9 material used to perform scan lines or data lines,
10 which is -- the purpose of extension is to form
11 those lines.

12 BY MR. MANZO:

13 Q I see. And the purpose of 8 is to cover
14 the upper level of metal, number 7, correct?

15 A 8 is to cover and protect the parts that
16 will be left exposed during the assembly process for
17 putting down the flexible printed circuit or during
18 the testing purpose before putting down the element
19 13.

20 Q Okay. So we are talking about 8 being in
21 the terminal portion of the LCD; is that correct?

22 MR. GIBSON: Objection; form.

23 THE WITNESS: You're asking the same thing.
24 I'm going to give you an answer.

25 What do you mean by "terminal portion"? I

1 think I explained -- I answered it and you asked me
2 again. Is your terminal portion different from the
3 previous terminal portion or is it something I
4 answered that is not clear?

5 BY MR. MANZO:

6 Q No. I'm trying to make the answer simpler.
7 If you remember, we looked at Exhibit 2010,
8 and you drew where a person of skill in the art in
9 consideration of Nakamoto would place the sealant.

10 Do you remember that?

11 A Yes. And then based on that, in view of
12 Nakamoto, I placed the sealant in Figure 2C of
13 Sukegawa.

14 Q Okay. So maybe a simple way to ask my
15 question is: Do you agree that the layer 8 does not
16 go further to the left of this exhibit and, instead,
17 it stops under the sealant where the sealant would
18 go?

19 A Well, how far -- it can certainly -- it
20 will have to stop before the first pixel electrode.
21 Where, exactly, it will stop will be determined by
22 the particular design. It cannot extend so far as
23 to touch the first pixel electrode, because it will
24 then be connected and the signal from the flexible
25 printed circuit will then appear to that pixel

1 electrode. So it will to stop short of that.

2 How far extends between the edge of where
3 it is now and inwards, it will depend upon the
4 particular design, the particular materials used
5 and --

6 Q Okay. Is there any indication in Sukegawa
7 that it can go from one side of the sealant to the
8 other side of the sealant?

9 MR. GIBSON: Objection; form.

10 THE WITNESS: You mean form one side of the
11 display over to the other side of the display?

12 BY MR. MANZO:

13 Q No, I did not mean that.

14 There is a sealant somewhere.

15 A Right.

16 Q And somewhere inside the sealant is a
17 display area?

18 A The sealant on one side.

19 Q You're talking about the sealant
20 circumscribes --

21 A I understand.

22 Q -- a display area.

23 A Yes.

24 Q And outside of the sealant is what I've
25 been calling the terminal portion, right or wrong.

1 A Okay. That's where you're referring
2 outside the sealant as the terminal portion?

3 Q Right.

4 A Okay.

5 Q And my question is -- and when I say
6 "inside the sealant," I don't mean literally inside
7 the sealant itself, I mean in the part of the LCD
8 within the region circumscribed by the sealant.

9 A Okay. I understand.

10 Q Good. So my question is: Is there any
11 indication in the Sukegawa patent that layer 8 can
12 traverse past the sealant?

13 A On the inside portion of --

14 Q Yes, of the device.

15 A I don't think Sukegawa describes that
16 element that you're referring to. It is a very
17 specific question. Sukegawa describes certain
18 features, and someone skilled in the art will then
19 have to take the features of Sukegawa, other prior
20 art and the particular requirements for the display
21 product that you want to fabricate in order to make
22 designs.

23 Q I understand.

24 A I told you in principle you cannot go
25 inside the array, but where, exactly, you will stop

1 it will depend upon many considerations.

2 Q Thank you.

3 A For example, in Nakamoto the ITO, I
4 believe, extends inside the sealant, but again stops
5 short of the array.

6 Q Well --

7 A If you look at the element D1, which we
8 refer in Nakamoto as ITO, it shows that it continues
9 from outside the sealant, under the sealant and
10 continues to the display.

11 But it will stop short of what is array,
12 because to continue to create a defect. So a
13 different pieces of prior art and depending upon the
14 design, it provide different implementations. All
15 these variations were well known in the art.

16 Q Now, if the ITO extends through or under
17 the sealant, does it cause a height difference by
18 virtue of it being -- of the ITO being there? When
19 I say "height difference," I mean it pushes the
20 space apart from the counter-substrate to the
21 substrate.

22 A ITO is a very thin layer relative to the
23 thickness of the other layers, so it will have a
24 very small effect on the high difference spread to
25 the other layers.

1 Q Going back to Sukegawa, with respect to the
2 relationship of wiring 2 to wiring 7, wiring 2 is
3 beneath wiring 7; is that right?

4 A 2 is right onto the substrate, correct.

5 Q So is it fair to say that the direction of
6 signal path from 7 to 2 is downward?

7 MR. GIBSON: Objection; form.

8 THE WITNESS: Well, within any given
9 context, you have -- within a given contact, the
10 signal will be downward, but between two adjacent or
11 between the first and the last, you have the signal
12 that will also propagate laterally.

13 In this particular embodiment, there are
14 four holes that are depicted, so depending upon the
15 extent of that region, and, of course, someone
16 skilled in the art will choose to make even more
17 holes, the signal will propagate on both lines in
18 the lateral direction, from the portion of the lines
19 that starts from the first hole all the way out to
20 the portion of the line that ends in the last hole.

21 BY MR. MANZO:

22 Q And it will also propagate downward through
23 the holes; is that right?

24 A In each individual hole, within an
25 individual hole will propagate downwards.

1 Within a hole -- you see, a hole has a
2 finite extent, so even within a hole, which may be
3 several microns long, the two wiring, 7 and 2, will
4 also constitute two parallel lines. So, in a way,
5 you also have a lower resistance in the X direction
6 or towards that direction which is along the bottom
7 of the hole, you'll also have a lower resistance
8 because you also have two lines.

9 So the power combination of the lines in
10 order to reduce -- which results in overall
11 reduction to the resistance of the structure is
12 continuous, starting from the rightmost hole in
13 Figure 2C from the rightmost edge of the first hole
14 continuing all the way out to the left edge of the
15 last hole.

16 In that entire segment, the two lines
17 constitute two parallel lines. Whether they are
18 touching physically or they are in separation, for
19 the purpose of electroanalysis they act as two
20 parallel lines.

21 Q Thank you.

22 If a person ordinarily skilled in the art
23 wanted to lower the resistance of wiring in the
24 terminal region of a LCD, wouldn't he or she be more
25 likely to use other ways than to add another line,

1 such as widening the existing line or thickening it?

2 MR. GIBSON: Objection; form.

3 THE WITNESS: In the semiconductor art,
4 you -- one who has skill in the art will understand
5 the advantages and the disadvantages of any action
6 that he takes in order to achieve a certain goal.

7 So if, for example, you say you increase
8 the thickness of a line, of a metal, and let that be
9 the wiring 2, for example --

10 BY MR. MANZO:

11 Q Okay.

12 A -- you say why, don't we just make --
13 triple the thickness of 2, that will have some --
14 and don't add 7, for the sake of argument, this is
15 hypothetical example that you mentioned.

16 If you increase the thickness of 2, you
17 increase the thickness of the scan lines, which go
18 across the display.

19 As we talked about, you have the scan lines
20 in orthogonal direction, you have the data lines in
21 an orthogonal direction, you're getting the data
22 lines. So the data lines have to go up and down the
23 crossovers with the 2. If you make 2 thick, you
24 make that more difficult for the data wiring to go
25 up and down and make a step coverage more difficult.

1 Q I see.

2 A If you make the -- so there is a limitation
3 of how thick you can make a line.

4 If you make the line wider, you may have
5 limitations of how close you can space the lines
6 before one is touching another one. You make
7 yourself susceptible to particle defects. In the
8 area of display itself, you don't want to make the
9 lines too wide because then they block the light.

10 So on the other hand, a double-layer line
11 may also have some shortcomings which are coming
12 from increased complexity.

13 So someone skilled in the art will take all
14 the advantages and disadvantages from every possible
15 way that he can use to make a structure and then
16 choose the best way possible for the particular
17 application.

18 In this particular example where you have
19 to make a connection and then you have to
20 potentially peel that connection and redo the
21 connection, you have to make it resistant to
22 peeling, as Sukegawa does.

23 And one way to make it resistant to peeling
24 is to anchor it, one layer with respect to another
25 layer.

1 Q In your declaration, paragraph 101, I just
2 wanted to ask you about 24. This phrase on the very
3 bottom line of page 36, very near the end, the
4 phrase that I'm asking you about is, quote, near
5 close, closed quote.

6 What does that mean? Or is --

7 A So if we look at Figure 9, you have tape
8 carrier package, 11, TCP, and that is instead of --
9 -- maybe that "near close" maybe that was a typo, I
10 have to write "very close" -- it is very -- located
11 very close to the sealant. It's a gap that is --
12 according to Sukegawa is used for testing or a small
13 gap in order to be able to align and move the tape
14 carrier package.

15 But you don't want to make that gap too
16 wide, because, as I said earlier today, that's a
17 region of the display that gets wasted that
18 contributes to the data area, not useful to make
19 display, and that unnecessarily increases the size
20 of the display, which limits how many displays can
21 be produced on a given mother glass size. And also
22 it contributes to an increase in the line resistance
23 if the length of the line becomes longer. So it
24 serves no advantage to make it far away.

25 Q If you turn to paragraph 106 of your

1 declaration, at page 38 you refer to the -- in
2 parentheses on the second line, you say, quote, the
3 sealant having been discussed above.

4 My question is where above?

5 A Can you give me a moment to read it,
6 please?

7 The sealant starts from paragraph 98, the
8 oldest paragraphs from 98 to 106, it's discussions
9 of -- that refer to the sealant.

10 Q Okay. Do you agree that Sukegawa does not
11 teach or suggest or motivate a person ordinarily
12 skilled in the relevant art in 1997 to place a
13 sealant in direct contact with a second insulating
14 film that is located over the first and second
15 wiring separated by a first insulator where both of
16 the first and second wirings traverse beneath the
17 sealant.

18 MR. GIBSON: Objection; form.

19 THE WITNESS: No.

20 BY MR. MANZO:

21 Q You don't agree?

22 A That's what you asked me, correct?

23 Q Yes, I asked you that.

24 A You asked if I agree it does not teach or
25 suggest and so on, and I said I do not agree with

1 your statement.

2 Q So you think that Sukegawa would teach the
3 direct contact with a second insulating film, or at
4 least teach, suggest or motivate the combination I
5 suggested?

6 MR. GIBSON: Objection; form.

7 THE WITNESS: Yes -- directed between the
8 sealant and the second insulating film, if I
9 understand your question.

10 BY MR. MANZO:

11 Q So is the second insulating film the layer
12 9 in Figure 2C?

13 A Correct.

14 Q And --

15 A And that, as you see in my drawing that I
16 have annotated, an exhibit that you handed me over
17 you see that sealant is in direct contact with 9.

18 Q Yes.

19 A You have argue on the placement of the
20 sealants, and reading in the response, you also --
21 the patent owner argue the placement of the sealant.
22 But no matter where the sealant is placed, whether
23 you agree or not agree with my drawing, in view of
24 Nakamoto, you have to agree that 9 is continuous.

25 So wherever you place the sealant, even if

1 you do not place it, where I place it, where a
2 person skilled in the art will place it, where I
3 have placed it, but for whatever reasons you
4 disagree that that is correct. But wherever you
5 choose to place it, it will still be placed over 9.

6 Q Okay. Let's assume that's correct for now.

7 A What do you mean by assuming it is correct?
8 You disagree that 9 is continuous?

9 Q I'm just trying to ask the rest of the
10 question?

11 A I'm trying to understand also your
12 formulation.

13 Q I understand. I'll try to be more clear.
14 Forgive me for my imprecision here, but it is
15 important that we understand this correctly.

16 So assuming that the sealant does contact
17 9, take that as a given for the question. My
18 question was assuming that that's true, does
19 Sukegawa disclose, teach, suggest or motivate a
20 person skilled in the art that both the first wiring
21 and the second wiring should traverse, completely
22 traverse, the sealant?

23 MR. GIBSON: Objection; form.

24 THE WITNESS: I -- is it a claimed
25 limitation that requires that the first wiring and

1 the second wiring traverse the sealant, or are you
2 talking about hypothetical structures?

3 BY MR. MANZO:

4 Q Well, if you look at Exhibit 1001, which is
5 the '413 patent, looking at the figure on the first
6 page of the patent, you'll see that the sealant at
7 the top marked 105, and it's in contact directly
8 with this second insulating layer marked 113, and
9 that below that both the external connection line,
10 403, and the auxiliary line, 401, go past where the
11 sealant is, at least that's what I see.

12 Do you see that too?

13 A I see in the Figure 4A which refers to a
14 particular embodiment, but I asked you whether there
15 are specifications in the claims that will require
16 that -- sorry -- whether there are limitations in
17 the claims that requires that.

18 Q Well, my question is regardless of the
19 claims, I'm asking you a factual question.

20 Does Sukegawa teach that or not?

21 MR. GIBSON: Objection; form.

22 THE WITNESS: Sukegawa teaches that the
23 lines can overlap with the sealant. Someone skilled
24 in the art will determine if they wish to extend
25 below the sealant one or both, depending upon the

1 particular design of product they wish to propagate.

2 You asked me hypothetically, in the design
3 of a particular display or particular product -- I'm
4 sorry, I don't understand completely the nature of
5 your question.

6 BY MR. MANZO:

7 Q Well, I think I'm -- what I'm hearing you
8 say is that a person of ordinary skill in the art
9 will decide. But my question was: Is there
10 anything shown or described in Sukegawa that says
11 that both of these, lines 7 and 2, should extend
12 from one side of the sealant on the terminal portion
13 and go past the sealant to the other side of the
14 sealant?

15 MR. GIBSON: Objection; form.

16 THE WITNESS: Well, definitely, as I
17 highlight earlier, the prior art that is in
18 Figure 2C that refers to that discuss to the
19 connection. But for the scan lines, then 2 can
20 extend under the sealant, and not only under the
21 sealant, but can extend all the way out to the other
22 side to the display.

23 When you are -- form the pads for the data
24 lines, data signal lines, as I described earlier, 7
25 will be the one that will extend all the way under

1 the sealant and all the way across the display.

2 So there's nothing in Sukegawa that puts
3 any limitation on whether 2 or 7 cannot extend under
4 the sealant or across the sealant. Because in one
5 set of pads, one is extended, at least, in the other
6 set of pads, the other is extended.

7 So it will take someone ordinarily skilled
8 in the art to say that if for the particular display
9 product that they are making, they need to get that
10 extra improvement in resistance across the length of
11 the sealant to continue both lines for the length of
12 the sealant.

13 But the length of the sealant relative to
14 the length of the pad and relative to the length of
15 the display is a small part.

16 But there is no limitation imposed that it
17 cannot be done across the length of the sealant in
18 the teaching of Sukegawa. Whether someone does it
19 or does not -- choose not to do it, it will depend
20 upon the particular design.

21 As you mentioned earlier, whatever we
22 put -- and the '413 discuss, whatever we put under
23 the sealant will increase the height of the
24 materials under the sealant.

25 One difference between the '413 and the

1 Sukegawa is that in the '413 it referring to
2 displays that had integrated display drivers within,
3 so you need to propagate under the sealant and you
4 need to reach that display driver at the periphery
5 of the display, of the TFT array.

6 In Sukegawa it is a display that is using
7 amorphous silicon and it uses external drivers, and
8 that's why you have hundreds of terminal
9 connections, each one for each gate line and each
10 data line. Hence, the display would start right
11 after the end of the sealant, so it would not be a
12 long distance past the sealant where you have
13 something else, such as the driver that the '413
14 discuss, that the length of the line that you have,
15 it will be long.

16 So that's why I said whether you choose to
17 have it as a single layer or double layer will
18 depend upon the particular display product and
19 application.

20 If you have integrated drivers and you need
21 to propagate long distances and you're sensitive to
22 the resistance, you can have a double-layer
23 wiring as -- if you continue double-layer wiring
24 past the sealant and if you don't need that one,
25 then you will stop short of extending -- you will

1 stop somewhere under the sealant.

2 There is not one unique answer, always this
3 or always that. It will depend upon the design and
4 the teaching -- excuse me, the design and
5 requirements of that particular system.

6 Definitely Sukegawa does not limit into one
7 or the other. The teaching is there to implement
8 both approaches.

9 BY MR. MANZO:

10 Q Is it? Where is the teaching that says you
11 can have both of these lines going all the way past
12 the sealant?

13 A Well, you have two parallel lines that
14 extend four holes -- 1, 2, 3, 4.

15 Q I see that.

16 A And they extend past the edge of the
17 flexible print circuit, element 31. And so -- and
18 the contents of double-layer lines, multilayer
19 lines, is not new, it is something that has been
20 used in semiconductor art for a long, long time. So
21 this is not a revelation or a new innovation.
22 Double layer lines were well known in semiconductor
23 art that are effective in reducing resistance
24 between two points.

25 And Sukegawa talks about using this

1 structure your to the reduce resistance.

2 And, as I said earlier in my testimony,
3 someone skilled in the art need to extend longer
4 distance, there's no -- they can do that. There's
5 nothing in the Sukegawa to suggest otherwise. On
6 the contrary, it does show structure, so all someone
7 needs to do is add more contact holes.

8 Q Do you agree that in Sukegawa the ITO layer
9 8 is never above, never on top of the layer 9?

10 A In the specific embodiments depicted in the
11 different figures, is not. But that's not --
12 someone skilled in the art will not be able to
13 change, and there are ways to put 8 on top of 9.

14 As I said, there are three layers here and
15 one is fixed in the order, and that is 7. And then
16 you have 8 and 9 to lay over. And there are two
17 possible ways to lay them over. Put 7 first --
18 sorry.

19 Put 8 first and then 9 or put 9 first and
20 then put 8. It's not rocket science. People knew
21 how to do those things for a while.

22 Q Is there any embodiments shown in Sukegawa
23 where 9 is put down before 8?

24 A I think I said not in the particular
25 embodiments described in Sukegawa, but someone

1 skilled in the art will know how to do that.

2 Q Was there a reason why Sukegawa put 8 down
3 before putting 9 down in the structure shown in
4 Figure 2C or any of the other structures?

5 A I do not recall Sukegawa putting a reason
6 of limiting to this particular embodiment or this
7 particular structure.

8 Q Could -- well, does 9 have a function in
9 Sukegawa?

10 A Sure. All layers have a function,
11 otherwise they wouldn't be used because they have
12 costs to the manufacturer. So 9 is a --

13 Q I think you called it a passivation layer
14 earlier.

15 A Right. As we saw in Nakamoto, there was a
16 label, passivation layer, in Nakamoto.

17 Q What is a passivation layer?

18 A The final insulating layer that puts on top
19 of the electronic devices for protection.

20 Q If 8 were on top of 9, we've decided that 8
21 is a conductive layer, isn't it?

22 A (No audible response.)

23 Q 8 is the ITO, the transparent conductive
24 layer.

25 A 8 is the transparent conductive layer.

1 Q Would you want to have that on top of your
2 passivation layer?

3 A If someone involved skilled in the art
4 would choose to have 8 as the outer layer or the
5 last layer, in other words, put 9 first and then the
6 8 on top of 9. Then instead of -- then that person
7 could create an opening in 9 before put down the 8.

8 Q Did you say could create an opening in 9 or
9 would have created an opening in 9?

10 A If you wanted 9 to touch 7, then it should
11 have created -- would have created -- now you are
12 playing with my English and it is speculative.

13 Q I apologize. I didn't mean to do that.

14 A If 8 -- if 9 is between 7 and 8, then
15 contacts are required for 8 to make the connection
16 to 7.

17 Q Well, could layer 9 serve its function if 8
18 were on top of 9?

19 MR. GIBSON: Objection; form.

20 THE WITNESS: Yes.

21 BY MR. MANZO:

22 Q Can you explain that?

23 A Well, 9 serves to protect the regions
24 below, and from, say, moisture or other things that
25 may corrode the metals. But as we discussed, 8

1 is -- Sukegawa refers to chemically stable material.
2 So having that material exposed as an outer layer,
3 it will not create a problem.

4 And that's also what is disclosed in
5 Nakamoto, so you have multiple pieces of prior art
6 that have 8 exposed. And even after you opening
7 the -- after you create the opening in 9 in
8 Figure 2C, 8 is exposed. So 8 does not need to have
9 environmental protection.

10 MR. MANZO: Let me take a recess, please.

11 THE VIDEOGRAPHER: We are off the record.
12 The time is 6:15 p.m.

13 (Recess.)

14 THE VIDEOGRAPHER: We are back on the
15 record. The time is 6:25 p.m.

16 BY MR. MANZO:

17 Q Going back to Sukegawa and layer 9 and
18 passivation, what is -- I'm not sure that I
19 understood your explanation of what a passivation
20 layer is in an LCD in this region.

21 Could you help me understand that? What
22 does layer 9 achieve?

23 A So in column 5, lines 12 it list finally a
24 silicon nitride film of about 200-nanometer
25 thickness covering both the transistor-forming

1 portion and the terminal portion is deposited by a
2 plasma on CPT method to perform a protective
3 insulating film 9.

4 So 9 is silicon nitride film. A nitride
5 film is resistant to -- does not -- it does not let
6 moisture and oxygen to go through, so it protects
7 the thin-film transistors and the wirings from
8 corrosion.

9 In the thin-film transistor area, there is
10 also another layer that will be deposited. That
11 will be the rubbing layers, or liquid crystal
12 alignment layers.

13 And those layers will go through what's
14 known as the rubbing process. It's a physical
15 process where -- almost like a brush will go and rub
16 the substrate to create channels where the liquid
17 crystal molecules will lay down and thus be aligned
18 along the direction of the rubbing, the rubbing
19 direction.

20 So having an insulating passivation layer
21 above the wiring above the TFTs and below the
22 rubbing layer will serve also as a mechanical
23 protection to the lines and the transistors so they
24 will not be damaged or scratched. So it serves a
25 plurality of reasons, purposes.

1 Q I see. I see.

2 Looking at Figure 2C, can you see that part
3 of the flexible printed circuit contacts that layer
4 9, the unlabeled part of it over here, on the
5 right-hand side of Figure 2C?

6 A This is what is depicted, so I cannot argue
7 with what is shown there.

8 But as you -- as I think I alluded earlier,
9 there is some alignment process that will happen
10 during the application of the flexible printed
11 circuit, because you have one element, being the
12 flexible printed circuit, and you have the substrate
13 that has this wirings for underneath. And the two
14 have to be aligned, because there are hundreds of
15 them, so you don't want the wrong signal to go to
16 the wrong connection.

17 So the two will first be aligned and then
18 they will be pressed to make a contact, and there
19 will be some sealant material in between.

20 Now, in this alignment process, if the 31
21 is shifted to the left, that overlap that you
22 indicated to me on the right portion of the figure
23 may not exist. It all depends how the 31 will be
24 aligned and what is the proper specifications during
25 the alignment process in whether it is going to be

1 successful or a failure.

2 MR. GIBSON: I think we're at seven hours.

3 MR. MANZO: Okay. In that case, we have no
4 further questions.

5 MR. GIBSON: I do not have any questions.

6 MR. MANZO: Well, let me ask him one more
7 question.

8 Q Is there anything you wanted me to ask you
9 that I didn't ask you? You don't have to answer
10 that.

11 A I'm sure you have the opportunity tomorrow
12 to ask me a lot more questions that you didn't ask
13 me today because the -- are you going to be the
14 person that will depose me tomorrow?

15 Q Yes.

16 A The specifications are the same, so I'm
17 sure there's plenty of opportunity to ask me lots of
18 questions tomorrow.

19 MR. GIBSON: With that, I think we're done.

20 MR. MANZO: Thank you very much,
21 Dr. Hatalis. Very nice to meet you.

22 THE WITNESS: Thank you.

23 THE VIDEOGRAPHER: We are off the record.

24 The time is 6:32 p.m. This concludes today's
25 testimony given by Dr. Milt Hatalis. The total

1 number of media used was 4 and will be retained by
2 Veritext Legal Solutions.

3 (TIME NOTED: 6:32 p.m.)
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5
6
7

8 I, MILTIADIS HATALIS, PH.D., do hereby
9 declare under penalty of perjury that I have read
10 the foregoing transcript; that I have made any
11 corrections as appear noted, in ink, initialed by
12 me, or attached hereto; that my testimony as
13 contained herein, as corrected, is true and correct.
14
15

16 EXECUTED this ____ day of _____,
17 2013, at _____, _____.
(City) (State)

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MILTIADIS HATALIS, PH.D.
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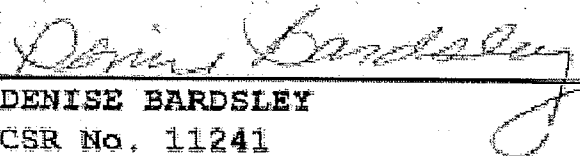
I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a true and correct record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: 5 July 2013


DENISE BARDSLEY
CSR No. 11241

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