

SEL EXHIBIT NO. 2017

INNOLUX CORP. 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

3 INNOLUX CORPORATION,)
4)
5 Petitioner,)
6)
7 vs.) IPR2013-00066
8) U.S. Pat. No.
9 SEMICONDUCTOR ENERGY) 7,876,413
10 LABORATORY CO., LTD.,)
11)
12 Patent Owner.)

13 The videotaped deposition of MICHAEL J.
14 ESCUTI, Ph.D., called by the Petitioner for
15 examination, pursuant to Notice, and pursuant to
16 the applicable rules, taken before Sandra L.
17 Rocca, CSR, CRR, at 115 South LaSalle Street,
18 Chicago, Illinois, on the 5th day of September,
19 2013, at the hour of 9:39 a.m.
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22
23
24
25

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1 APPEARANCES:

2

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Also Present:

Ms. Mary Ann Naas, Videographer

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2 WITNESS PAGE

3 MICHAEL J. ESCUTI, Ph.D.

4 EXAMINED BY

5 Mr. Gibson 5

6 Mr. Schlitter 273

7 EXHIBITS

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9 Deposition Exhibit

10 No. 1001 U.S. Pat. No. 7,876,413 64

11 No. 1003 U.S. Pat. No. 5,636,329 64

12 No. 1004 Nakamoto patent, English and

Japanese translations 64

13 No. 1006 Imagine Optix web page 31

14 No. 1007 NC State web page re

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15 No. 1008 Opto-Electronics & Lightwave

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16 No. 1009 Opto-Electronics & Lightwave

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17 No. 1010 NSF Lab Module web pages 37

18 No. 1011 schematic of Shiba Fig. 4 from

Escuti '413 declaration

pg. 94 129

19 No. 1012 Fig. A schematic of Shiba

Fig. 4 from Escuti '204

declaration, pg. 49 130

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24

25 (continued)

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1 EXHIBITS

2 NUMBER PRESENTED

3 Deposition Exhibit

4 No. 1013 schematic Fig. B (Modified

Fig. 4 of Shiba) from Escuti

'204 declaration, pg. 50 130

5 No. 1014 New Modified Fig. 4 of

Shiba schematic 139

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7 No. 1015 U.S. Pat. No. 7,697,102 176

8 No. 1016 U.S. Pat. No. 6,404,480 178

9 No. 1017 SEL-CMO 0064398 179

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14 No. 2010 schematic re Fig. 2C prior art 66

15 No. 2012 M. Escuti Declaration 29

16 No. 2013 LG Display product info

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17 No. 2014 Chungghwa Picture Tubes web

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18 No. 2015 ShinMaywa web page, 2 pgs. 116

19 No. 2016 Pascal web page, 2 pgs. 116

20 No. 2017 Micro-Tec web pages, 7 pgs. 116

21 No. 2018 ULVAC web pages, 2 pgs. 116

22 No. 2019 MicroFab web page, 4 pgs. 116

23 No. 2020 SIJ Technology web pages,

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1 VIDEOGRAPHER: My name is Mary Ann Naas

2 of Veritext. Today's date is September 5th, 2013.

3 The time is approximately 9:39.

4 This deposition is being held in the

5 office of Steptoe & Johnson located at 115 South

6 LaSalle Street, Chicago, Illinois.

7 The caption of the case is Innolux Corp.

8 versus Patent of Semiconductor Energy Lab in the

9 United States Patent and Trademark Office. The

10 name of the witness is Dr. Michael Escuti.

11 At this time will the attorneys please

12 identify themselves, after which our court

13 reporter, Sandra Rocca of Veritext, will swear in

14 the witness and we can proceed.

15 MR. GIBSON: Stan Gibson on behalf of

16 the Petitioner.

17 MR. SCHLITTER: Stan Schlitter of

18 Steptoe & Johnson and Edward Manzo of Husch

19 Blackwell on behalf of the patent owner.

20 MICHAEL J. ESCUTI, Ph.D.,

21 having been first duly sworn, was examined and

22 testified as follows:

23 EXAMINATION

24 BY MR. GIBSON:

25 Q. Good morning. Could you state your name

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1 and spell your last name, please.
2 A. My name is Michael Escuti. Last name is
3 spelled E-s-c-u-t-i.
4 Q. And I take it you've had your deposition
5 taken before?
6 A. I've had a deposition taken three times
7 before.
8 Q. Even though you're somewhat familiar
9 with the process, I just want to go over the
10 background rules briefly with you.
11 You understand that you've taken an oath
12 to tell the truth?
13 A. I do understand that.
14 Q. And that's the same oath you would take
15 as if you were testifying in a court of law.
16 You understand that?
17 A. I do understand that.
18 Q. If at any time you do not understand one
19 of my questions, please let me know and I'll be
20 happy to rephrase it. The court reporter sitting
21 to your right is taking down your testimony today
22 and at the conclusion of your deposition, you'll
23 receive a booklet of your testimony and have the
24 opportunity to make changes and corrections to
25 your testimony. But please be advised, if you do

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1 make any changes or corrections, we can comment on
2 your credibility as it pertains to those changes
3 or corrections.
4 Do you understand that?
5 A. I do understand that.
6 Q. Any reason why your deposition cannot
7 proceed today?
8 A. There is no reason.
9 Q. When were you first contacted in this
10 matter?
11 A. As best as I can recall, it was in
12 April.
13 Q. Of this year?
14 A. Of this year, yeah.
15 Q. And what were you asked to do?
16 A. At first I was asked to review the '413
17 patent that we're talking about today and join a
18 meeting with the attorneys here and discuss my
19 understanding of the patent and the possibility of
20 my joining the IPR in support of this patent.
21 Q. And I take it you then accepted the
22 assignment?
23 A. I did.
24 Q. And what did you understand that your
25 assignment was to do in this case or in this

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1 petition?
2 A. My assignment is to and was to consider
3 the prior art in relative terms to this patent and
4 evaluate the positions that the positioner -- that
5 the Petitioner was taking toward the Board or has
6 taken in the petition and form opinions about
7 those and advise the team on what the technical
8 issues are and things like that.
9 Q. And other than attorneys for the patent
10 owner, did you communicate with anyone regarding
11 the subject of your assignment at any time?
12 A. I have not communicated with anyone
13 aside from the attorney team on this matter.
14 Q. And what did you review to formulate
15 your opinion for this matter?
16 A. The complete list, I think, is listed in
17 my declaration of what I've reviewed, but it began
18 with the '413 patent. I also reviewed the
19 petition, the Board's decision, the request for
20 rehearing and the decision of the request for
21 rehearing.
22 Of course, I also reviewed the prior
23 art, in particular Sukegawa and the patent
24 Nakamoto and others in connection with the '413
25 litigation.

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1 Q. When you say "and others," what are you
2 referring to?
3 A. Well, Shiba is also another reference
4 that's -- that I commented on for this patent and,
5 of course, there's a closely related case that
6 we'll talk about tomorrow with at least one
7 additional reference.
8 Q. Did you review any other prior art in
9 performing your assignment on the '413 patent?
10 A. Certainly not in detail. Aside from
11 these references, this is what I've examined in
12 detail.
13 Q. When you say "not in detail," are there
14 things that you looked at that you did not look at
15 in detail, but there are other references that you
16 looked at?
17 A. Along the way I certainly searched --
18 for example, one of the issues in this case is
19 contact through an opening and I certainly looked
20 through other prior art for an understanding of
21 what other prior art gave about that -- that
22 terminology and what an appropriate and reasonable
23 definition would be.
24 But it turned out that the references we
25 already had were representative of that -- that

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1 was evidence enough for my position on that, so
 2 that I didn't turn to those. I didn't need to
 3 turn to those because they were cumulative.
 4 Q. Do you recall what you reviewed in that
 5 regard, the ones that you didn't need to turn to?
 6 A. I don't recall.
 7 Q. Did you review any other patents that
 8 are owned by SEL other than the '204 and the '413?
 9 A. In this matter, I did not review any
 10 other patents. Of course, I can't recall if
 11 sometime in my career I've reviewed patents that
 12 are assigned to SEL. I don't recall.
 13 Q. But doing this assignment, you don't
 14 remember reviewing any other SEL patents?
 15 A. That's correct. In this assignment, I
 16 didn't review any other patents owned by this
 17 patent owner.
 18 Q. Are you familiar with any other patents
 19 owned by SEL, other than '204 and '413, as you sit
 20 here today?
 21 A. I'm not familiar with any other patents
 22 that are involved in any litigation that SEL --
 23 SEL has.
 24 Q. Well, apart from litigation, are you
 25 aware of any at all?

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1 A. No, I'm not.
 2 Q. Let's talk a little bit about your
 3 educational background.
 4 If you can tell me where you graduated
 5 from college and what year?
 6 A. I graduated with my Bachelor's of
 7 Science in electrical and computer engineering in
 8 1997 at Drexel University. I then went on to
 9 graduate school and earned two degrees, first a
 10 Master's and then a Ph.D., where the final year
 11 for the Ph.D. was 2002 and that was at Brown
 12 University, also in electrical engineering.
 13 Q. And the Master's, is that also at Brown?
 14 A. It was.
 15 Q. And do you remember what year that was?
 16 A. It's in my CV specifically, of course,
 17 but as best as I can remember, it was 1999.
 18 Q. And were you working in industry at all
 19 from 1997 to 2002?
 20 A. I consulted with industry as a
 21 consultant, but I was not employed or working
 22 during that time because I was a graduate student.
 23 So I had consulting outside of my academic
 24 responsibilities and, in addition, I was supported
 25 in part by industrial funding in the context of

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1 the university research.
 2 Q. And who were you consulting for?
 3 A. There were three firms that I can
 4 specifically remember. One was Cabot. Another
 5 was a small firm that was -- to be honest, I don't
 6 remember their name. They were a very small firm
 7 and local to Providence, Rhode Island. And then
 8 -- then lastly, there was some consulting to 3M,
 9 of course at St. Paul, Minnesota.
 10 Q. And what type of consulting work were
 11 you doing for Cabot?
 12 A. The consulting work was to advise them
 13 on their questions for using a particular kind of
 14 material that they had and had certain material
 15 properties and they were looking for opportunities
 16 to use it and market it -- well, to use it in an
 17 application that could lead to new business for
 18 them.
 19 Q. And for the small firm?
 20 A. For the small firm, it was a -- it was
 21 actually to help them create a toy. It was quite
 22 fun. They were -- they were a firm, more of --
 23 more of a design firm, and they wanted to create
 24 skateboarding/rollerblading glove that would have
 25 a circuit inside it so that a child could press a

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1 button and then have it make a noise and make a
 2 song or make various things happen. So it was an
 3 integrated circuit that I was designing and
 4 prototyping for them.
 5 Q. Do you know if that was ever
 6 commercialized?
 7 A. It was a very small outfit and I think
 8 that project was -- came to a prototype and then
 9 didn't find any future funding.
 10 Q. And then what were you doing for 3M?
 11 A. For 3M, my principal role was to lead
 12 short courses, a series of short courses that was
 13 on the subject of LCDs and displays more
 14 generally. It went beyond LCDs.
 15 So this was in conjunction with my Ph.D.
 16 advisor where we were both creating the short
 17 course and presenting it to them in their facility
 18 to technical folks of all kinds.
 19 Q. And when did you first start either
 20 studying or working with LCDs?
 21 A. I first became aware of the principles
 22 of LCDs and TFTs during my Bachelor's degree
 23 training, so that would be before 1997. During
 24 graduate school is when I first began building
 25 them and making them myself in the lab, and that

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1 has continued in my research to today.
2 Q. So during your graduate studies, what
3 kind of LCDs were you building or making?
4 A. We constructed most kinds. We had a lab
5 facility where I and my colleagues would prototype
6 the -- sometimes the whole display system, but
7 typically, it would be -- we'd make a single pixel
8 or a small number of pixels.
9 And so we'd make it from the glass to
10 the substrates and to the patterning of electrodes
11 and in some occasions with TFTs and -- and the
12 kinds of LCDs would vary quite a lot because it
13 was research, after all, so it wasn't simply the
14 standard modes, the twisted nematic and the other
15 modes, but it was -- it delved into other modes
16 that would be more energy efficient, for example,
17 and that was certainly a hot topic at the time.
18 Q. When you say occasionally you were
19 dealing with TFTs, what were you doing when you
20 were not dealing with TFTs?
21 A. Well, we studied, I think, the displays
22 as a system. We didn't just study one small
23 aspect or a single aspect of displays during
24 graduate work. We studied displays as a system
25 and so that system required multiple aspects. One

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1 of them is, of course, the optics of an LCD. The
2 other aspect has to do with the electronic control
3 of the LCD pixels.
4 And then there's -- there's sort of the
5 information that drives those circuits or that
6 goes into those circuits as well. So we've -- we
7 studied all of that and my emphasis was on the
8 first two things I just said, the optics and the
9 electronics.
10 Q. What were you doing with the optics?
11 A. Could you say specifically when?
12 Q. During your graduate studies, what were
13 you -- what were you studying or experimenting
14 with in terms of the optics?
15 A. I studied many things. So, for example,
16 my dissertation was about -- I can't remember
17 precisely the title. That's also in my CV, but it
18 was about novel LCDs and photonic switches. And
19 so we looked at birefringent layers and the effect
20 of controlling polarization.
21 We looked at holographic means to create
22 displays. We studied displays that would be
23 bistable, so that you -- you didn't have to put
24 voltage on them all the time, but you could -- you
25 could just activate them when you needed to change

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1 something. There were many, many things that we
2 looked at in the optical side.
3 Q. And that's what your dissertation was,
4 was on the optical side?
5 A. My dissertation had an emphasis on
6 optical physics, but it also involved display
7 systems, and in one case the in-plane switching
8 mode, which definitely involved the electronics
9 because key to that is a set of electrodes and
10 pixel control system that is different than
11 standard, and I had to make that as well.
12 Q. Now, when you obtained your Ph.D., you
13 then -- it looks like you did a post-doc in the
14 Netherlands, is that right?
15 A. I did, following my Ph.D., spend two
16 years as a post-doc in the Netherlands, in
17 Eindhoven specifically.
18 Q. And what were you doing there?
19 A. While I was there, I was physically at
20 the technical university that's in Eindhoven. But
21 in their system, there's a blending that's quite
22 great. I think it's quite good for students where
23 industry serves roles within the university in a
24 very intimate way.
25 So while I was there, one of my

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1 supervisors was a very senior person in Philips
2 Research labs, which is also located there. So
3 my projects were influenced by both the university
4 side and the industry side that was there. So my
5 work specifically focused on LCDs and -- among
6 other things.
7 Q. What were you doing with LCDs?
8 A. Well, one of the things we were looking
9 at there -- and as I recall, there's a publication
10 on this -- has to do with backlights and efficient
11 backlighting for LCDs.
12 Q. Anything else that you did in those two
13 years with LCDs?
14 A. Yes, yes.
15 Q. What's that?
16 A. There were -- there were many other
17 things that I've done during that time. It's --
18 I'm certainly not going to remember all of it. It
19 was a dynamic research environment where we could
20 explore different things.
21 So another thing that we studied was
22 organic light-emitting diodes and some of the
23 material properties that are involved in the
24 semiconducting materials.
25 So we looked for ways to optimize them

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1 both from the chemistry -- I'm not a chemist, but
2 I was working with chemical engineers. We also
3 looked for ways, using other principals, to
4 control the molecules themselves to improve
5 performance, whether it was light extraction or
6 mobility enhancement. There were many things that
7 we were looking at.
8 Q. Anything else that you can recall in
9 that two-year period?
10 A. Right now I can't specifically remember
11 anything else.
12 Q. All right. And then you became an
13 assistant professor at NC State?
14 A. Following my post-doc, I began my
15 position at NC State in 2004 as an assistant
16 professor.
17 Q. And what types of courses were you
18 teaching in that or have you taught in that
19 six-year period?
20 A. The six-year period being when I was an
21 assistant professor?
22 Q. Yes.
23 A. Well, in my role as assistant professor,
24 of course I both teach and research and the
25 teaching involved -- one course that I taught was

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1 the -- was an introductory circuits course that
2 involves a lab as well and it's required by all
3 our students in the department to take. So that's
4 "Circuits, Signals and Systems."
5 Another course that I taught during that
6 time, actually created, was a course on LCDs and
7 organic electronics, and that course in particular
8 had support from the National Science Foundation
9 for me to develop the lab portion of that course.
10 And so in that course, students -- that
11 I created with one of my graduate students, we
12 would guide our students to actually make the
13 elements we were studying. So they made a simple
14 LCD, they made an organic TFT, they made an
15 organic solar cell and an organic LED, and then
16 they tested it and evaluated it. So that's
17 another course that I taught.
18 There's a third course I taught that --
19 I think it's at least approximately titled
20 "Introduction to Photonics and Optical
21 Communications."
22 Q. Okay. And in terms of research, what
23 were you doing while you were an assistant
24 professor?
25 A. As an assistant professor, I studied --

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1 well, my focus has always been on the interaction
2 of light and matter and so it's this field of
3 optoelectronics, sometimes it's called photonics.
4 And many of the applications that I look at
5 involve displays, not exclusively, but involve
6 displays, but also telecom, energy harvesting
7 sensors, camera systems, optical recording.
8 And so my interest is to study and
9 innovate in the material side and the architecture
10 of a system for a particular application. So one
11 example of that is related to LCDs that has
12 continued even now is the design of projectors and
13 LC -- direct-view LCDs which have improved energy
14 efficiency compared to our standard technology.
15 Q. Anything else you were researching in
16 that time period?
17 A. Yes. During that time period, I advised
18 I think five Ph.D. students, four or five. We
19 studied topics that relate to nonmechanical beam
20 steering. We studied topics that have to do with
21 optical filtering. We studied topics that have to
22 do with optofluidics, which -- which is this field
23 where particles or cells are within a fluid and
24 there are optical means to control them, to move
25 them, to grab them, to analyze them. So that was

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1 still another -- another side.
2 And in my research, we also investigated
3 optical TF -- I'm sorry -- organic TFTs and
4 enhancements that we can offer using the other
5 principles that we have for improved performance.
6 Q. Anything else that you can recall in
7 that six-year time period, from 2004 to 2010, in
8 terms of research?
9 A. At the moment, I can't recall anything
10 further.
11 Q. All right. Then in 2010 you became an
12 associate professor at NC State?
13 A. I did.
14 Q. And did your courses change or did they
15 stay the same?
16 A. My courses around that time changed. I
17 began teaching a new course on electromagnetics
18 and it's also required by all students in my
19 department. It's an undergraduate course and that
20 includes transmission lines and circuits inside
21 it, as well as the more general principles of
22 classical electromagnetics.
23 Q. Any other courses that changed?
24 A. Yes, there's one other one which began
25 this semester and it's the first time I'm teaching

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1 it. It's also the first time it's being taught
2 anywhere in the university. And this course is
3 "Introduction to Nanoscience and Nanotechnology."
4 So this has an emphasis on, of course,
5 nanotechnology and its applications in -- across
6 many fields, including nanoelectronics,
7 nanomaterials, biotechnology, among many others.
8 Q. And what about your research? Is there
9 anything different since 2010 in your research?
10 A. In my academic research, I think largely
11 I've continued the general directions that I laid
12 out. I certainly have a different emphasis now.
13 Some are more -- I'm spending much more time on
14 than others, but it's largely in the same
15 directions.
16 Q. What are you spending much more time on?
17 A. Well, the two project directions that
18 are more and more important, one of them is
19 displays and display systems where we have
20 technologies that solve energy problems or
21 complexity problems within display systems. So
22 that's one.
23 Another is in telecom. So we are able
24 to make elements that have great benefits to the
25 telecom industry. So we have an emphasis on

Page 23

1 studying that and providing prototypes for
2 industry. It's industry-sponsored, in fact. Both
3 of these are industry-sponsored.
4 Q. When you say "telecom," can you be a
5 little more specific?
6 A. Well, this may not be as specific as
7 you're asking, but it's hardware that would
8 support an optical fiber system, for example,
9 supporting the internet.
10 A third project that's taking much of
11 our attention is in the direction of making
12 optical films for astronomers and so there's
13 several astronomers that we've been working for
14 that study -- they're called exoplanets and solar
15 systems that have planets around them and so we,
16 in partnership with them, create elements that
17 help them do that.
18 Q. Apart from ImagineOptix, which we'll get
19 into in a moment, have you done -- and apart from
20 what you've just discussed -- have you done any
21 other work for industry while you've been at
22 NC State?
23 A. I think it's the case that all of my
24 work while I've been at NC State with industry,
25 outside of ImagineOptix, has been through the

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1 university, through sponsored programs that
2 industry would pay the university to sponsor
3 research in my lab.
4 Q. And that's the kind of research you were
5 just discussing?
6 A. Yes.
7 Q. And ImagineOptix, how did that get
8 started?
9 A. ImagineOptix started in -- actually,
10 right as I joined NC State, I encountered two of
11 my co-founders. They are father and son, so they
12 have the same last name and confusingly, they have
13 the same first name, but they have different
14 middle names.
15 So I met them and we founded the company
16 with -- where it was clear that they saw an
17 opportunity to build pico projectors, small
18 projectors that could be integrated into other
19 devices including cell phones, but also other
20 things like camcorders and it -- as we -- as we
21 talked, we realized that my technology that I was
22 already studying for my post-doc and had plans to
23 pursue at NC State, would be a very good solution
24 for that. So we joined together.
25 I became, you know, a majority

Page 25

1 shareholder of the company and we then proceeded
2 from there. And that's really where it started.
3 It continued then to seek funding from -- from any
4 means that we could to establish the company and
5 pay for the intellectual property costs, for
6 example.
7 Q. And when you said your technology would
8 be a great fit for what they were doing, what were
9 you referring to in terms of your technology?
10 A. Well, the technology that we had been
11 studying and continue to study today, offers a
12 dramatic improvement to the energy efficiency of a
13 display system when configured in the ways that we
14 were pursuing. And so that means that, for
15 example, your cell phone display or your projector
16 could have twice the efficiency that it would
17 otherwise without our technology using standard
18 methods and, of course, that means that your cell
19 phone would last twice as long roughly, or a
20 projector could be twice as bright, still using
21 all the same power or other technology.
22 So that's the basis of the technology,
23 but that can be applied in many ways and there
24 were at least two ways that we applied it. One
25 way was to integrate it into the liquid crystal

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1 layer along with micro-displays and direct-view
2 screens.

3 So in that case, we were designing
4 systems and building prototyping systems that
5 involved the TFT plane and our technology which
6 directly applies in the optical layers and in a
7 whole system, you know, with control drivers and
8 electronics and software that would do that. So
9 my company was pursuing several projects or did
10 pursue several projects and prototypes that lead
11 to that kind of thing.

12 Q. Is the technology focused on the optical
13 layer?

14 A. Well, the technology involves
15 electronics. It's -- so I'm not sure -- can you
16 rephrase the question?

17 Q. You mentioned --

18 A. It's not --

19 Q. -- the technology went into the optical
20 layer. So I'm just trying to understand, was the
21 technology -- is that what was special about the
22 technology was the changes in the optical layer or
23 was it something else?

24 A. The technology's value occurs in the
25 optical layer and so this improvement in energy

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1 efficiency is related to the optics of what's
2 going on in the display, but the technology
3 depends on the electronics that support it. So
4 it's not apart from the electronics. It's an
5 optoelectronic technology. So --

6 Q. Is that described in -- I didn't mean to
7 cut you off. Go ahead.

8 A. I'm sorry. Well, just as an example,
9 because we're changing the liquid crystal layer,
10 that necessarily in our case led to requirement
11 changes in the TFT layer. For example, we
12 required different voltages than were standard and
13 so we had to build backplanes and work with
14 systems that had that difference in particular.

15 Q. Anything else in change in the TFT
16 layer?

17 A. I think many things changed in the TFT
18 layer. It had to be completely redesigned for our
19 technology and that's what our team did.

20 Q. And is this -- are these products --
21 have they been commercialized at all or --

22 A. That set of projects led to prototypes
23 and it led to new ideas that we have continued
24 with. So that particular approach to implementing
25 the technology we have not pursued recently and

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1 the simple reason was that we found better ways to
2 do it that would not displace the current
3 technology quite as much. So it would compliment
4 it rather than replace it.

5 Q. And can you give me a general
6 description of how this technology, this new
7 technology that you're working on now would
8 compliment and not replace?

9 A. The energy -- the improvement in energy
10 efficiency that I've been referring to this whole
11 time occurs because the elements we make handle
12 both polarizations of the light at the same time,
13 whereas almost all LCD systems use only one
14 polarization at a time. Typically, that's one of
15 the linear polarizations.

16 In our case, we're making elements that
17 handle and manipulate both at the same time. So
18 because we're handling both, we can send both
19 through the system. We can use unpolarized light
20 rather than polarized light, and as you may know,
21 most light sources, LEDs or fluorescent lights,
22 outside lighting is unpolarized. And so to be
23 used in an LCD, it first has to be formatted for
24 use in the LCD and that process generally cuts out
25 half the light as absorption, as loss.

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1 Q. So is this a technology that's focused
2 on the optical layer?

3 A. I don't think that's a fair
4 characterization. As we just said, it's a
5 technology that -- where the benefit occurs in the
6 optical layer, but it has consequences in the
7 electronic layer as well.

8 Q. Let me just go ahead and hand you your
9 declaration, which I think also has your CV
10 attached, which is Exhibit 2012.

11 (Document marked previously as Exhibit
12 Number 2012 was presented.)

13 BY MR. GIBSON:

14 Q. Do you recognize that as your
15 declaration and your CV at the end? And I believe
16 your signature's on page 101.

17 Sorry, your signature's not on page 101.
18 It's earlier than that.

19 A. My signature's on page 3. It appears to
20 be my declaration and its appendices.

21 Q. And Appendix B is your -- that's your
22 curriculum vitae?

23 A. That's my CV as of the date that's on
24 it, which of course was April.

25 Q. Are there updates since then?

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1 A. There are minor updates, at least in my
2 opinion, to the list of publications and to the
3 issued patents since that time.
4 Q. And do you know what the updates are to
5 the list of publications?
6 A. I don't recall in great detail, but I
7 know that there is one journal paper that was, I
8 think, just last week published.
9 Q. Where was that published?
10 A. As best I recall, it's in the journal
11 Optics Letters.
12 Q. Do you know what that paper was focused
13 on?
14 A. I do. If it's the one I'm thinking of,
15 it's -- as you can imagine, there are many
16 manuscripts that are in play at any one time. So
17 I think this particular manuscript had to do with
18 what are called vortex beams and these are optical
19 beams that have additional quantum properties that
20 can be used both in communication systems, in
21 sensing, and also in the optofluidics context that
22 I mentioned earlier.
23 MR. GIBSON: And why don't we go ahead
24 and mark this as 1006?
25 THE WITNESS: Thank you.

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1 (Document marked as Exhibit Number 1006
2 for identification.)
3 BY MR. GIBSON:
4 Q. And can you tell me what 1006 is?
5 A. It appears to be a printout of the
6 ImagineOptix website, one page in the ImagineOptix
7 website.
8 Q. Do you know who created the website?
9 A. Well, at least approximately I do.
10 The -- my partners in the company worked with a
11 firm to create the website such as it is, and the
12 drawings -- these in particular are technical
13 drawings that either come out of my published
14 papers or conference publications of various
15 sorts, at least everything except the photograph.
16 I think that was taken by my -- by my company.
17 Q. Okay. So the technical drawings, that
18 would be your work?
19 A. My work or my students' work.
20 Q. That you supervised?
21 A. That I supervised.
22 Q. And can you tell me what's described in
23 terms of the technical aspects of the work here?
24 A. As you can see in the text, this page is
25 about polarization gradings and it's a kind of

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1 diffractive optical element that has unique
2 properties and that's what's being illustrated
3 here. Do you want me to go into the technical
4 properties of polarization gradings?
5 Q. No.
6 Is this some sort of a beam splitter?
7 Is that an accurate way to call this?
8 A. There are many ways to call this
9 element. One is as a hologram or a grading. If
10 you use it as a beam splitter, that's one thing
11 you could do. You could also use it in an LCD, as
12 we talked about earlier, as a way to switch the
13 pixel or to switch what happens to the light
14 through that pixel. It's not a simple beam
15 splitter.
16 Q. So is this the technology you were
17 describing earlier that you're currently working
18 on at ImagineOptix?
19 A. This is part of the technology. There
20 are many other pieces of the technology.
21 Q. Does this use an organic material?
22 A. It uses both. The inorganic substrate
23 is usually some kind of glass. It could also be
24 metal, aluminum. It could be ITO. It could be --
25 could be silicon in one of my projects and -- but

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1 the liquid crystal layer is necessarily an organic
2 material. All liquid crystals, that I'm aware of
3 are -- involve organic components to them.
4 Q. Are there TFTs used in this process with
5 this technology?
6 A. Certainly. When this is combined with
7 the backplane for an LCD system, as I talked about
8 earlier, then yes, there are TFTs involved with
9 that.
10 Q. And are those organic TFTs?
11 A. They were not. They were silicon-based
12 TFTs and more recent projects with the company are
13 looking at gallium nitride TFTs.
14 Q. Which is a liquid?
15 A. No, it's a compound semiconductor.
16 MR. GIBSON: Let me have this marked as
17 1007.
18 (Document marked as Exhibit Number 1007
19 for identification.)
20 BY MR. GIBSON:
21 Q. And can you tell me what Exhibit 1007
22 is?
23 A. 1007 appears to be a printout of my
24 university profile page as a faculty member in my
25 department. So it includes, as you can see, a

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1 biography, list of education, kind of a mini --
2 mini resume, certainly not complete and not
3 updated recently now that I'm looking at it.
4 Q. And would you consider this to be
5 accurate?
6 A. As far as I'm aware, everything that's
7 here is accurate, but it's certainly not
8 comprehensive and the audience -- I mean, the
9 purpose of this is simply to inform students of
10 who I am and has a very different purpose than
11 being -- I guess being a full, real resume.
12 Q. But there's nothing inaccurate about it?
13 A. Not that I'm aware of.
14 MR. GIBSON: If we could mark this as
15 1008.
16 (Document marked as Exhibit Number 1008
17 for identification.)
18 BY MR. GIBSON:
19 Q. And do you recognize Exhibit 1008?
20 A. It's a little hard to say because I
21 think this page doesn't look like this when it's
22 on the screen. But I suspect it's the -- it's a
23 printout of my group's website, its main page.
24 Q. When you say "group," this is your group
25 at NC State?

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1 A. Yes, my group from the point of view of
2 my students and post-docs.
3 Q. And do you see anything inaccurate about
4 this?
5 A. Like I said before, it's not updated I
6 think recently and so it's certainly not complete,
7 but it's -- I don't -- I'm not aware of anything
8 inaccurate.
9 Q. Do you have plans to update it in the,
10 you know, next month or two?
11 A. I don't have plans to update it in the
12 next month or two. I do hope that sometime in the
13 next year I update it.
14 MR. GIBSON: If we could mark this as
15 Exhibit 1009.
16 (Document marked as Exhibit Number 1009
17 for identification.)
18 BY MR. GIBSON:
19 Q. And do you recognize Exhibit 1009?
20 A. I think I do.
21 Q. And what is it?
22 A. It appears to be another printout of a
23 different page of my group's website.
24 Q. And is there anything on this page
25 that's inaccurate?

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1 A. It is not complete. It's not been
2 updated recently, but I'm not aware of anything
3 that's inaccurate.
4 Q. And it's something else that you would
5 plan to update in the next year or hope to update
6 in the next year?
7 A. I do hope to update, if I can find the
8 time in my priority list.
9 Q. I think you discuss in your declaration
10 that you've worked with students fabricating LCDs
11 and TFTs?
12 A. Can you show me in my declaration where
13 you're referring to?
14 Q. Yeah, let me -- I believe it's in
15 pages 6 to 7.
16 A. You're referring to paragraph 9?
17 Q. Yes, at the bottom where it talks about
18 you developed a laboratory course on liquid
19 crystal displays and organic electronics.
20 A. I do see that in paragraph 9.
21 Q. Is that the research course you were
22 talking about that also involved the lab before?
23 A. That is the course I was referring to
24 before. It's -- to be precise, it's not -- I
25 don't think it's proper to call it a research

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1 course.
2 Q. It involves lab work, but it's not for
3 research?
4 A. That's correct. It's for teaching,
5 which generally has a different purpose, but it
6 was supported by, as it says, the NSF. And so
7 creating the course involved research into how,
8 with basic materials, to educate the students on
9 the organic materials and building systems without
10 a full clean room to do so.
11 MR. GIBSON: If we could mark this as
12 1009 -- sorry -- 1010.
13 (Document marked as Exhibit Number 1010
14 for identification.)
15 BY MR. GIBSON:
16 Q. And do you recognize Exhibit 1010?
17 A. I think so.
18 Q. And what is it?
19 A. It appears to be another page from my
20 group's website that in this case is focused on
21 the lab portion of that course we were just
22 speaking about.
23 Q. And is there anything inaccurate about
24 these pages?
25 A. They're not current, but I'm not aware

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1 of anything inaccurate in them.
2 Q. When you say "they're not current," how
3 old are they?
4 A. You mean when were they last updated?
5 Q. Let's start with that. When were they
6 last updated?
7 A. I don't recall. You know, you could
8 probably just as easily find out online. If you
9 want me to estimate, I think it's two years since
10 we updated these pages.
11 Q. Has the course changed in those two
12 years?
13 A. Somewhat, but I think in a very minor
14 way.
15 Q. And this is one of the courses you're
16 still teaching?
17 A. It's one of the courses that in general
18 I'm teaching, but right now this semester, I'm not
19 teaching it.
20 Q. The only module that relates to TFTs is
21 Module 4, is that correct?
22 A. Can you tell me what you mean by
23 "relates to"?
24 Q. Where you're actually teaching a
25 construction of a TFT.

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1 A. In this course, in this lab -- this set
2 of lab modules, the last one, Module 4, does focus
3 explicitly on TFTs, but I don't want to give the
4 impression that the other elements don't involve
5 that in -- don't involve TFTs because in the
6 course, the lecture part of the course, clearly
7 we're teaching principles of active matrix TFTs
8 for use in LCDs, for use in organic light-emitting
9 diode displays as well. So even if they're not
10 being fabricated, they're certainly part of those
11 other topics.
12 Q. The Module 4 that's dealing with organic
13 thin film transistors, how would you define an
14 "organic thin film transistor"?
15 A. I think a fair definition is to -- is to
16 look at the semiconducting layer and if that
17 material is organic, then it's an organic TFT, as
18 opposed to an inorganic TFT where the
19 semiconductor is not -- is not formed from organic
20 materials.
21 Q. And what type of organic materials are
22 you using in your course?
23 A. Well, they're listed on the second page,
24 so we have -- I'm sorry, listed on the third page.
25 The semiconducting layer has -- is a polymer.

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1 It's a high molecular weight polymer that is --
2 has the acronym P3HT. That stands for, you know,
3 the molecular name that you see in the paragraph
4 there. So it's poly(3-hexylthiophene).
5 Q. And I take it on the front page there's
6 a Module 4 -- there's a picture of Module 4 OTFT.
7 Is that a picture of the TFT as it's
8 been fabricated?
9 A. It is an example from a student in this
10 laboratory, which let's keep in mind, is designed
11 so that undergraduate students with very limited
12 knowledge can create a working and functional TFT
13 within two hours or so in a fairly conventional
14 lab room and not in a clean room process.
15 So it doesn't look all that impressive,
16 but it actually functions like a TFT and it's very
17 exciting for students to go through that process
18 building it themselves.
19 Q. You said the inorganic material was used
20 for the semiconductor in this one.
21 Is there also an organic material used
22 for the gate dielectric?
23 A. Well, that's true. I think there is a
24 -- the insulating layer is a -- in this example,
25 it's polyvinyl alcohol, PVA, and the main -- of

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1 course the main reason for that is that that's an
2 insulating layer that students can very easily
3 apply or deposit.
4 It's very easy to create that kind of
5 insulating film as opposed to many of the other
6 oxides that are possible. They have to be grown
7 in CVD or some other very sophisticated chamber,
8 which was counter to the goals of this course.
9 Q. And the ITO is being used as the source
10 and drain electrodes for creating the electrical
11 connections to the TFT?
12 A. In this case, that's the conductor that
13 we used, ITO. Well, plus one other. It may be a
14 detail, but as part of the gate electrode, there's
15 also gallium indium, which is a liquid at room
16 temperature.
17 Q. Let's look at your CV for a moment,
18 which I think you said it lists all your
19 publications, except for maybe there's one that
20 just came out which you identified, is that
21 correct?
22 A. As best I recall, there's at least one
23 that is not listed here because it was published
24 since this was submitted and prepared. And there
25 are some additional patents that have been

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1 awarded. They've gone from the application column
 2 to the issued column.
 3 Q. Have you updated your CV since you
 4 prepared this one?
 5 A. I have not. I update it as needed, when
 6 asked.
 7 Q. So are -- the list of publications,
 8 though, without that -- absent that one, you think
 9 is correct?
 10 A. As best I recall, it's absent at least
 11 one and I can't recall if there's any others.
 12 Q. And would you agree that as a university
 13 professor, your scholarly work is going to be
 14 expected to be in the form of publications or
 15 journals or conferences?
 16 A. I wouldn't limit it as such, but it
 17 includes that. My scholarly work certainly goes
 18 into the publications and journals and
 19 conferences, but it also goes into the
 20 intellectual property that's coming out of the
 21 university as well as invited research
 22 presentations that may not have a paper connected
 23 to them.
 24 Q. All right. And the intellectual
 25 property, those would be in your patents or patent

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1 applications?
 2 A. They are -- of course they begin as
 3 invention disclosures and then something can
 4 happen to them and many times it does lead to one
 5 or more patent applications. And as best I
 6 recall, there are ten invention disclosures that
 7 have come from my time with students at the
 8 university at NC State, and there were some from
 9 my graduate school time as well and some from my
 10 post-doc time.
 11 Q. And those are all listed in your CV?
 12 A. All of the patent applications and
 13 issued patents are listed. I don't think I
 14 included the invention disclosures themselves.
 15 Q. And the -- are there invention
 16 disclosures that didn't become applications?
 17 A. I can't recall any.
 18 Q. And your invited research presentations,
 19 those are listed on your CV, I believe, on page 7
 20 onto 8?
 21 A. They -- they are.
 22 Q. And focusing on the publications, were
 23 you the one who did the first draft of these
 24 publications?
 25 A. It depends.

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1 Q. Okay. So these may be the outcome of
 2 your own work or it could be in collaboration
 3 with students or other researchers?
 4 A. I think all of my publications have
 5 coauthors and that's on purpose because, of
 6 course, I'm a mentor and an educator. So whenever
 7 possible, I want students involved in the work.
 8 In addition, I also put a lot of
 9 emphasis on partnerships with industry and other
 10 universities so that we can collaborate and come
 11 with up with something greater than just the sum
 12 of the partners. So I do have collaborators, I
 13 think, on all of my publications.
 14 Q. Would you consider these publications to
 15 be a personal contribution in the field of science
 16 and technology?
 17 A. I would.
 18 Q. In terms of your expert witness
 19 experience, which I think is also listed here, it
 20 sounds like you've done a few cases with one
 21 ongoing and the others have been resolved.
 22 I think you've done four cases other
 23 than this, one?
 24 A. That's correct. The four are listed in
 25 my CV in the first page into the second page.

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1 Q. Do any of your publications deal with
 2 active matrix displays, circuit and peripheral
 3 driving circuits that are provided on the same
 4 substrate?
 5 A. One of my publications includes
 6 explicitly in the publication an active matrix
 7 backplane. That's the one cited in my
 8 declaration. There may be others, but I can't
 9 recall.
 10 Q. Can you identify which one that is?
 11 A. Sure. It's identified in paragraph 11
 12 of my declaration.
 13 Would you like me to identify it in my
 14 CV?
 15 Q. Yes.
 16 A. So that paper I'm referring to is
 17 Number 29 in my conference proceedings list.
 18 Q. What's a conference proceeding?
 19 A. It's a peer-reviewed paper that is
 20 presented at a conference as well. So it's a very
 21 much like a journal article but, of course,
 22 there's an accompanying presentation.
 23 Q. Is it something that is published?
 24 A. Yes, it is published.
 25 Q. The journal publications themselves,

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1 which you've listed as 1 through 33, do any of
2 them deal with active matrix display circuit --
3 peripheral driving circuits that are provided on
4 the same substrate?
5 A. I should check to be sure. I believe
6 that none of the publications in the -- listed in
7 the journal publications include a focus on the
8 TFT backplane, but there's a reason for that and
9 that is that it's -- that work that I've done is
10 in relationship with my company and other --
11 another company as well and for I guess business
12 reasons, we haven't chosen to publish it.
13 Q. Would that be found in your patents?
14 A. Not necessarily. So, for example, the
15 project that I referred to early on when I was
16 assistant professor, some of that is published in
17 that journal -- I'm sorry -- in that conference
18 proceeding that I pointed to. But almost all of
19 it is not published, expressly because it was
20 related to intellectual property and business
21 opportunities.
22 Q. And when you say the work that you did
23 when you were an assistant professor that you
24 mentioned earlier, what specifically are you
25 discussing?

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1 A. I could go back through the transcript
2 and find that, but is that what you want me to do?
3 Q. No, I just want you to refresh my memory
4 as to what you're referring to.
5 A. We began this deposition going through
6 my time as an assistant professor, then associate
7 professor and in that discussion, I referred to a
8 project that did involve TFTs. That's what I'm
9 referring to.
10 Q. That project?
11 A. Well, that -- yeah, that work, which
12 depending on how you look at it, is multiple
13 projects, but that's what I'm referring to.
14 Q. Any of your publications address
15 peripheral driving circuits such as shift
16 registers and decoders for driving an active
17 matrix display circuit and external connecting
18 lines for electrically connecting those circuits?
19 A. They do not explicitly address that.
20 Q. And you would agree that 1997 is the
21 point for determining one of ordinary skill in the
22 art for this matter?
23 A. I would for this matter.
24 Q. And what type of person would you say is
25 one of ordinary skill in the art as of 1997?

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1 A. Oh, I think the description in my
2 declaration is the most helpful thing to turn to.
3 It's in paragraph 30. It says, "I believe a
4 person of ordinary skill in the art in the field
5 of the '413 patent in 1997 would be aware of
6 liquid crystal display structures including
7 techniques for providing connections therein and
8 to circuits outside a sealant."
9 Q. Do you think that person would have had
10 any expertise fabricating those circuits?
11 A. I think there are many ways to get at
12 this level of ordinary skill and some of the ways
13 could involve not personal experience with
14 fabrication.
15 Q. What about any kind of educational
16 background? Would they need to have any kind of
17 educational background in particular?
18 A. Again it's, I don't think, limited. I
19 think there are many ways to get to this ordinary
20 level of skill. I think the typical way would be
21 -- would involve education, some number of years
22 in an engineering kind of program, could be up to
23 a Bachelor's degree, but I don't think it should
24 be limited to that.
25 Q. What techniques would they have to be

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1 aware of in 1997?
2 A. Well, the ones I'm specifically
3 referring to here that I'm adopting from the case
4 before I joined it, is providing connections
5 therein and to circuits outside a sealant.
6 Q. So from your perspective, that person
7 may not even have to have a B.S. degree?
8 A. I think so, yeah. I think in other
9 countries there are many ways to get to this level
10 of ordinary skill. Especially in Asia, I think
11 they have different tracts that would be something
12 less than a Bachelor's degree equivalence over
13 here.
14 Q. And any type of courses that they would
15 need to take?
16 A. It's hard to say. Again, they would
17 need to understand something about semiconductor
18 processing, but it would not necessarily have to
19 be in a lab. They would have to understand what
20 it means to work with a sealant and certain
21 circuit principles and some of the basic aspects
22 and fundamentals that relate to the materials
23 we're talking about.
24 Q. What would they have to know about
25 certain circuit principles?

| | |
|--|---|
| <p style="text-align: right;">Page 50</p> <p>1 A. I think, for example, they'd have to 2 understand conductivity and how materials relate 3 to conductivity. 4 Q. Anything else? 5 A. There are many other things that I think 6 go into this language and a person of ordinary 7 skill would need to understand many techniques. I 8 think I'd have a hard time listing them out all 9 for you. 10 Q. What would they have to know about a 11 sealant? 12 A. I think they would have to understand 13 how a sealant works, how it's generally applied in 14 the field, the principles of adhesion of a sealant 15 on various surfaces, for example. 16 Q. As of 1997, would you consider yourself 17 to have qualified as a person of ordinary skill in 18 the art? 19 A. I would. 20 Q. And what is that based on? 21 A. At the time I would -- by 1997, I had 22 taken courses that involved labs as well as 23 lectures in microelectronics, in semiconductor 24 processing and the operations of LCDs, not just 25 the operation, but the building and construction</p> | <p style="text-align: right;">Page 52</p> <p>1 Q. Can you think of any others other than 2 those two? 3 A. Those are clearly the primary ones. I 4 think there are, in addition, many research level 5 materials that were being pursued at that time, 6 including organic TFTs and other materials, oxides 7 of all kinds, semiconducting oxides. 8 Q. If we're just talking about products, 9 liquid crystal display products, what materials 10 were being used with TFTs? Just those two? 11 A. No, I would not limit it to those two. 12 So, you know, there are other compound 13 semiconductors. Gallium nitride, which is -- is 14 used in some context, but clearly silicon, 15 polysilicon -- I'm sorry -- yeah, amorphous and 16 polydomain silicon would be the primary material 17 used in -- by 1997. 18 Q. Okay. And in your publications, do any 19 of those address amorphous silicon TFTs? 20 A. The publication that I pointed to 21 earlier in my conference proceedings list, it's 22 mentioned in my declaration, the semiconductor in 23 that project was silicon and it was a backplane of 24 silicon. And it's a -- yeah, it's a silicon 25 backplane.</p> |
| <p style="text-align: right;">Page 51</p> <p>1 and principles of LCDs, including the sealant, as 2 well as the optics and the backplane driving 3 principles. 4 So even by that time, 1997, when I 5 finished my Bachelor's degree, I had that 6 experience. 7 Q. So you would consider this to be a 8 fairly low level for an ordinary skill in the art? 9 It's not someone who has to have a Ph.D. or even a 10 Master's? 11 A. That's -- that's certainly my intention. 12 It's a person of ordinary skill, not an expert 13 skill. 14 Q. Now, as of 1997, what type of thin film 15 transistors were used in the manufacture of active 16 matrix liquid crystal displays? 17 A. Could you be any more specific in terms 18 of what types you mean? What are you referring 19 to? 20 Q. What type of material? 21 A. Oh, there were many -- certainly many 22 kinds that were used at the time commercially. I 23 guess the big categories would be amorphous 24 silicon. Second category would be polysilicon, 25 and there, I think, are many others beyond that.</p> | <p style="text-align: right;">Page 53</p> <p>1 Q. Was it amorphous silicon? 2 A. I can't recall. 3 Q. Okay. And any of your other 4 publications or your conference proceeding address 5 amorphous silicon TFTs? 6 A. I can't recall if any of them have a 7 mention of it, but I think you're asking for more 8 than just a mention of it. But aside from that 9 publication, I don't recall that any of the other 10 ones focus on amorphous silicon. 11 Q. And can you tell at the time of the 12 claimed invention, 1997, what type of TFTs were 13 used in the fabrication of active matrix display 14 products that had an integrated driving circuit 15 that was on the same glass substrate? 16 A. Well, to be clear, I think having the 17 active matrix and the peripheral circuits was not 18 standard at the time and nor is it standard now. 19 It's one of the options that can be done. 20 Now, I do think that if a peripheral 21 driving circuit is present, then it's most likely 22 amorphous or crystalline silicon that is used or a 23 polycrystalline. It depends on the application. 24 Q. But in 1997 -- specifically focused on 25 1997 and those LCD display products, you're saying</p> |

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1 there are ones out there that were amorphous
2 silicon?
3 A. I'm not specifically aware of any, but
4 it is possible to create something like that for
5 -- for example, for low quality, low cost kinds of
6 displays that one might use in toys, it may be
7 possible to do that. It depends.
8 Q. Are you aware of any that were using a
9 polycrystalline silicon?
10 A. Similar. Of course, polycrystalline
11 silicon would be -- would have a better
12 performance and could be used for that in some
13 settings.
14 Q. I guess my question wasn't "could." I
15 just want you -- to understand whether you were
16 aware of any liquid crystal display products that
17 were actually using a polycrystalline silicon for
18 the TFTs?
19 A. I can't name a product or paper from my
20 memory that would include that, but I expect that
21 there are some.
22 Q. Now, can you point to any of your
23 publications or conference papers in your
24 curriculum vitae that address polycrystalline
25 silicon TFTs?

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1 A. To my -- to my knowledge, the list of
2 publications, both in journals and conference
3 proceedings, do not include an explicit component
4 that would have polycrystalline silicon in a
5 backplane. Any work that I've done in that regard
6 is unpublished.
7 Q. And can you point to any of your
8 publications in your curriculum vitae that deal
9 with active matrix circuit and driving circuit
10 formed on a substrate using a TFT?
11 A. As I think we've discussed already, I
12 think any work that I've done on that is not
13 published.
14 Q. And the work that you referred to was
15 unpublished was this work that you referred to
16 earlier as an associate professor working for the
17 company ImagineOptix?
18 A. It's work that was done as assistant
19 professor and associate professor, most likely,
20 with ImagineOptix and other partners.
21 Q. What I'm getting at, that's what you --
22 we've already covered that?
23 A. I believe so, but if -- we may need to
24 go back through and see what you're asking me
25 about.

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1 Q. Do you recall what materials or what
2 metals are used in the fabrication of the source
3 and drain electrodes for the thin film transistors
4 in the various wirings over the glass substrate
5 that are taught by the '413 patent, the Sukegawa
6 patent and the Nakamoto patent?
7 A. I'd have to see the specification to
8 refresh my memory to be able to answer that.
9 Q. And if I told you that there was -- that
10 they reference chromium, aluminum, tantalum and
11 molybdenum, would that refresh your memory?
12 A. That doesn't seem to relate to your
13 question. Those are, of course, conductors and
14 metals.
15 Q. Do any of your publications or
16 conference papers address those types of metals
17 for making source and drain electrodes and wirings
18 onto a glass substrate?
19 A. What was the specific list of metals?
20 Q. Chromium, aluminum, tantalum and
21 molybdenum.
22 A. Yes, there are many publications I have
23 on reflective substrates with some of those.
24 Q. Is it easy for you to identify a few of
25 those?

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1 A. It may not be easy. I'd have to go
2 through the actual publications and confirm for
3 myself. But if you want, I can take a moment and
4 look.
5 Q. That's fine.
6 MR. GIBSON: Why don't we change the
7 tape?
8 VIDEOGRAPHER: We're going off record.
9 This is the end of Media Unit Number 1. The time
10 is 10:55.
11 (Short recess.)
12 VIDEOGRAPHER: We're back on record.
13 This is the beginning of Media Unit Number 2 in
14 the deposition of Dr. Michael Escuti and the time
15 is 11:13. Please continue.
16 BY MR. GIBSON:
17 Q. Before we broke, I think we were
18 discussing whether any of your publications or
19 conference papers dealt with those four materials.
20 And I don't know if you've had a chance to review
21 that or think about that, but if you can identify
22 a few. If it's easy to do, fine. If it's not,
23 then we can move on.
24 A. I didn't take any time to do that over
25 the break, no. So if you want me to take the time

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1 now, I'm happy to.
2 Q. It depends how long -- I don't want you
3 to take, you know, too long. If it's going to be
4 too difficult, then we'll skip it.
5 A. Well, there are almost 90 publications
6 here to think through and recall based on the
7 titles, so I think it will take a while.
8 Q. All right. The '413 patent, Sukegawa,
9 Nakamoto, also lists several insulating films that
10 are used as insulating layers in the TFT array.
11 Do you recall that?
12 A. I'm not sure which specification you're
13 referring to. Can you rephrase it or give me the
14 specification you're asking me about?
15 Q. All right. So you don't recall what the
16 materials that were used for the insulating films?
17 A. Is that your question, what are the --
18 repeat your question.
19 Q. Those three patents, do you recall what
20 insulating -- what materials are used for the
21 insulating layers?
22 A. And what are the three patents?
23 Q. The '413, the Sukegawa and Nakamoto.
24 MR. SCHLITTER: Objection, form.
25 THE WITNESS: I recall that some of the

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1 examples explicitly cited include silicon nitride,
2 but they are not limited to that.
3 BY MR. GIBSON:
4 Q. Do you recall also if there was silicon
5 oxide?
6 A. As best I recall, yes, but I'd have to
7 look through them to be certain. I think that
8 would be typical in this context.
9 Q. And are any of your publications or
10 conference presentations, do any of those address
11 metals for making source and drain electrodes and
12 wirings onto a -- onto a glass substrate?
13 A. What do you mean by "address"?
14 Q. Do they discuss using those -- using
15 metals for making source and drain electrodes and
16 wirings onto the glass substrate?
17 A. I'd have to -- similar, I'd have to
18 identify which one. Certainly in my work I have
19 made prototypes that involve these metals for
20 source and drain electrodes, but what I can't
21 recall is whether it wound up in publications that
22 are listed here.
23 Q. Or conference papers?
24 A. Or conference papers.
25 Q. Would you agree that the '413 patent,

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1 the Sukegawa patent and the Nakamoto patent all
2 describe multi-layer wiring structures that are
3 used to carry signals via a flexible printed
4 circuit into an active matrix display?
5 MR. SCHLITTER: Objection, form,
6 foundation.
7 THE WITNESS: I would not agree. I
8 would not agree with that statement.
9 BY MR. GIBSON:
10 Q. Why not?
11 A. Well, you use the word "multi-layer
12 wiring structure," right, in singular, at least
13 that's how I heard it. And so I instead would say
14 that in especially the '413 and the Sukegawa
15 patent, there are multiple wirings that form,
16 along with an insulator in between and in the
17 terminal portion other aspects, a connection from
18 the terminal portion to the display portion.
19 In Nakamoto, there is, as best I recall,
20 and maybe you should -- I should see the reference
21 before I offer this, but so -- I'll stop there.
22 Q. I did use the word "structures."
23 Does that change your answer if it's
24 plural?
25 A. It depends on what you mean by your

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1 phrase. What do you mean by "multi-layer wiring
2 structure"?
3 Q. Do you understand what that would mean
4 as one much ordinary skill in the art, multi-layer
5 wiring structure?
6 A. A person of ordinary skill in the art
7 would -- could have multiple structures that come
8 from that, multiple -- that phrase can have
9 multiple meanings. It's not precise enough.
10 Q. All right. So you're not aware, as
11 you're testifying, how the '413 patent, Sukegawa,
12 Nakamoto describe multi-layer wiring structures
13 that are used to carry signals via a flexible
14 printed circuit into an active matrix display?
15 MR. SCHLITTER: Objection, form,
16 foundation.
17 THE WITNESS: I am aware of how these
18 patents use multiple layers, some conductors, some
19 insulators to provide connections from a flexible
20 printed circuit to an active matrix display.
21 You're characterizing it as a
22 multi-layer wiring structure and each of those
23 patents have very different structures in them,
24 and so I don't want to be limited to describing
25 them all together with that one phrase.

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1 BY MR. GIBSON:
2 Q. Do any of your printed publications or
3 conference papers address using multiple layers of
4 wiring to carry signals via a flexible printed
5 circuit into an active matrix display?
6 A. I recall that all my work with a
7 flexible printed circuit is unpublished.
8 Q. And have you -- have we discussed that
9 work that you've done with the flexible printed
10 circuit earlier in the deposition?
11 A. Some of the prototypes involved in the
12 work we've discussed involved a flexible printed
13 circuit onto glass substrates with an active
14 matrix on it.
15 Q. And would you characterize those as
16 having multi-layer wiring structures that are used
17 to carry the -- that are used to carry the
18 signals?
19 MR. SCHLITTER: Objection, form.
20 THE WITNESS: It depends on how you're
21 characterizing that phrase.
22 BY MR. GIBSON:
23 Q. Are there multiple layers of wires?
24 MR. SCHLITTER: Objection, form.
25 THE WITNESS: Can you give me an example

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1 of what you mean by "multiple layers of wires"?
2 BY MR. GIBSON:
3 Q. Is there more than one layer of wiring?
4 A. If you mean by that are there multiple
5 metal deposition steps where they -- where there
6 are conductors in different physical layers in the
7 sequence of layers on the backplane, if that's
8 what you mean, then yes.
9 Q. In what project was -- were you dealing
10 with an FPC or a flexible printed circuit in that
11 context?
12 A. It was related to the work with
13 ImagineOptix and the partners through -- through
14 them in those early projects that I had in my
15 early time at NC State where we were applying the
16 technology in a way that required changing and --
17 well, that required designing and fabricating
18 backplanes for that purpose for our technology.
19 Q. And that work, none of that was
20 published I think you said, is that right?
21 A. To my knowledge, that work is -- is
22 still not published.
23 Q. And it's not in any patents or patent
24 applications?
25 A. Not that I'm aware of.

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1 Q. Let's go ahead and give you a few
2 exhibits in the case, Exhibit 1001, which is the
3 '413 patent.
4 MR. SCHLITTER: Thank you.
5 (Document marked previously as Exhibit
6 Number 1001 was presented.)
7 BY MR. GIBSON:
8 Q. Do you recognize that as the patent
9 that's at issue in the petition?
10 A. I do. It does appear to be the '413
11 patent.
12 Q. Hand you Exhibit 1004.
13 MR. SCHLITTER: Thank you.
14 (Document marked previously as Exhibit
15 Number 1004 was presented.)
16 BY MR. GIBSON:
17 Q. And would you agree that that's the
18 Nakamoto patent along with its translation?
19 A. It does appear to be the Nakamoto patent
20 in the original and its translation.
21 Q. Okay. And let's give you Exhibit 1003,
22 which is the Sukegawa patent.
23 (Document marked previously as Exhibit
24 Number 1003 was presented.)
25

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1 BY MR. GIBSON:
2 Q. Is that the Sukegawa patent?
3 A. It does appear to be the Sukegawa U.S.
4 patent.
5 Q. And those are the three patents that you
6 reviewed for your declaration in this matter?
7 A. These are three of the prior art patents
8 that I reviewed. There's one additional, Shiba,
9 that I included in my declaration.
10 Q. Why did you include Shiba in your
11 declaration?
12 A. The primary reason was related to the
13 definition of the phrase "through an opening."
14 And there's a section we can turn to, if you'd
15 like, where I give many examples in Shiba and
16 others where contact through an opening is
17 consistent with the Board's first definition as a
18 term of art.
19 Q. Now, I want to focus on the sealant and
20 I'm going to give you Exhibit 2010, the placement
21 of sealant. I'm sure you're familiar with that
22 issue in this matter?
23 A. I am. I'm familiar with the matter and
24 this marked-up figure.
25

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1 (Document marked previously as Exhibit
2 Number 2010 was presented.)
3 BY MR. GIBSON:
4 Q. You understand this is a figure that
5 Professor Hatalis created during his deposition?
6 A. That's my understanding.
7 Q. And you disagree with where he put the
8 sealant, correct?
9 A. Well, my opinion more precisely is
10 Sukegawa disagrees with his placement.
11 Q. But you disagree with his placement?
12 A. It's my opinion that one of ordinary
13 skill would not put the seal where he has placed
14 it.
15 Q. You would agree that Sukegawa would have
16 sealant?
17 A. Sukegawa mentions that there is a
18 sealant, but does not mention or disclose at all
19 where the sealant would be positioned, except I'll
20 note he does not illustrate it in this figure or
21 any of the terminal portions in Sukegawa.
22 So I think it's fair to say that
23 Sukegawa is teaching that wherever the sealant is,
24 it's not where Dr. Hatalis has put it.
25 Q. Now, but my question was, you would

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1 agree there is sealant being used in Sukegawa?
2 One of ordinary skill in the art would understand
3 that there's going to be sealant used?
4 A. I do agree that a person of ordinary
5 skill would -- would hear what Sukegawa has said
6 about the fact that there should be sealant
7 holding the two substrates together and that it
8 should be somewhere between the two substrates
9 illustrated in Fig. 3D.
10 Q. And why do you believe there has to be
11 some sealant?
12 A. Well, the sealant's function is to
13 really do two things. It's to first keep the
14 liquid crystal material, which is literally a
15 liquid, inside between the two substrates. And
16 it's also -- and it does so in large part by
17 keeping the two substrates together with a firm
18 adhesion. And so by 1997, and it continues today,
19 a sealant is the means to do that.
20 Q. Now, in your declaration, if you'd turn
21 to page 48.
22 A. Page 48, paragraph 94?
23 Q. Right above that, the drawing that you
24 made, you put a counter substrate on top of the
25 sealant that was drawn by Dr. Hatalis or Professor

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1 Hatalis?
2 A. The marked up figure that's here on
3 page 48 of my declaration does show a counter
4 substrate that shows where I think one of ordinary
5 skill would understand that counter substrate to
6 be if the sealant was placed where Dr. Hatalis has
7 placed it.
8 Q. And the placing of the counter substrate
9 that you have there is consistent with Nakamoto,
10 correct?
11 A. Can you tell me what you mean by
12 "consistent with"?
13 Q. You've placed it the same way that
14 Nakamoto places the counter substrate over the
15 sealant?
16 A. Can you tell me what you mean by "the
17 same way"? I don't understand what you mean.
18 Q. Look at Fig. 9 of Nakamoto.
19 Do you have that in front of you?
20 A. I do. I now have Fig. 9 of Nakamoto.
21 Q. And you would agree that there's a -- in
22 Fig. 9 we have a substrate?
23 A. There's a substrate and a counter
24 substrate in Fig. 9 of Nakamoto.
25 Q. And there's an SL marking. Would you

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1 understand that to be sealant?
2 A. That is what Nakamoto refers to as the
3 sealant.
4 Q. And do you see that the counter
5 substrate is over the sealant?
6 A. I do see that.
7 Q. And then just as you've drawn in your
8 declaration on page 48, the counter substrate
9 extends into that open region if we look at
10 Sukegawa as marked by the 13?
11 A. Well, what I see is that the sealant is
12 not the edge of the counter substrate and that it
13 does overhang in the explicit disclosure of
14 Nakamoto and I think that is a good example of
15 what one of ordinary skill would -- would do in
16 any case with the sealant, to have an offset back
17 from the edge of the substrate some distance.
18 Q. So your drawing in Fig. -- on Fig. 2C on
19 page 48 of your declaration is consistent with
20 Nakamoto's Fig. 9?
21 MR. SCHLITZER: Objection, form.
22 THE WITNESS: It's not consistent in
23 this aspect: My drawing of Fig. 2C includes the
24 counter substrate where the whole point is that
25 that counter substrate would then block the

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1 checking terminal that is underneath element 13.
2 And certainly in Sukegawa, having access to that
3 terminal after the two substrates are joined is
4 paramount. It's central to his objectives to
5 still provide access to that checking terminal.
6 So if the sealant was where Dr. Hatalis
7 put it, the counter substrate would block access
8 to that.
9 BY MR. GIBSON:
10 Q. And it's your view in Fig. 9 it's
11 blocked in Nakamoto?
12 A. In Fig. --
13 MR. SCHLITTER: Objection, form.
14 THE WITNESS: In Fig. 9, there is more
15 distance between the counter substrate and the
16 FPC. So it is different. I mean, they both have
17 a counter substrate that is overhanging the
18 sealant, that's true. But in Nakamoto, the
19 counter substrate is well away from the FPC so
20 that the checking terminal can still be accessed.
21 BY MR. GIBSON:
22 Q. It's still overhanging the open area
23 that when we look at Fig. 2C it's designated 13,
24 correct?
25 MR. SCHLITTER: Objection, form.

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1 THE WITNESS: Can you point me to the
2 particular area in Fig. 9 that you're referring
3 to?
4 BY MR. GIBSON:
5 Q. It looks like it has the initials -- I'm
6 not sure if it's MPX or --
7 A. EPX?
8 Q. EPX. Do you see that area?
9 A. I do see the epoxy region.
10 Q. Okay. And what does the -- you see the
11 counter substrate's overhanging the epoxy region?
12 A. That's what the figure shows.
13 Q. And what do you understand the purpose
14 of the epoxy is there?
15 A. Nakamoto describes the purpose of the
16 epoxy as protecting the sealant.
17 Q. Is it also holding the two substrates
18 together?
19 A. Not necessarily. If it's an epoxy, then
20 that means it's a kind of glue and so to some
21 extent, it's adhering at least to the sealant.
22 But I think it's possible to design materials so
23 that it just sticks to the sealant and not to the
24 substrates on the other side. Clearly it's
25 contacting it, but whether it's adhering or not is

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1 a different matter.
2 Q. Why wouldn't you want it to adhere?
3 A. Could you repeat the question?
4 Q. Sure. I mean, is there -- why would you
5 want the epoxy not to adhere to the two
6 substrates?
7 A. Well, it's less about what I would want
8 to do, of course, but what Nakamoto discloses.
9 Nakamoto discloses two things, right? First,
10 there's a sealant which adheres to the two
11 substrates and keeps the liquid crystal inside
12 between glass and then there's an epoxy that
13 protects the sealant. There's just no disclosure
14 that it has to adhere to the substrates.
15 Q. My question's a little bit different.
16 Why is -- why would one of ordinary
17 skill in the art want to design the epoxy so that
18 it wouldn't adhere to the two substrates?
19 MR. SCHLITTER: Objection, foundation.
20 THE WITNESS: I don't -- I don't think I
21 can speculate on that.
22 BY MR. GIBSON:
23 Q. You don't know one way or the other?
24 A. Certainly Nakamoto doesn't disclose one
25 way or the other and at the moment I can't -- I

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1 don't know one way or the other what one of
2 ordinary skill would consider in that case.
3 Q. In terms of -- I think you had some
4 discussion about the repairing operation that's
5 described by Sukegawa. Do you recall that? I
6 think it starts on page 161 -- or paragraph 161,
7 page 80.
8 A. Let me take a quick look to refresh my
9 memory.
10 Are you referring to the paragraphs with
11 letters underneath that paragraph --
12 Q. Yes.
13 A. -- 161? Okay, so they relate to the
14 discussion of peeling, that's true.
15 Q. And do you have anything in your CV that
16 discusses -- any publications or anything else,
17 your experience on TFT LCD repair?
18 A. It's a -- it's certainly true that in my
19 work I've had to repair and do my best with
20 displays and TFT backplanes that have not turned
21 out perfectly. I'm not sure I would call that the
22 peeling operation that -- that is identical to
23 what's in Sukegawa, but certainly I have faced the
24 challenge of making the connection with an FPC to
25 a backplane and certainly that doesn't always work

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1 out the way we want it to.
2 Q. But have you published anything,
3 patents, publications, conference papers, on TFT
4 LCD repair?
5 A. I can't recall that that kind of topic
6 is in any of my publications or patents, but
7 certainly that kind of thing occurs when
8 fabricating real devices.
9 Q. But you don't have any publications or
10 any particular --
11 A. I can't recall.
12 Q. -- conference papers or anything like
13 that?
14 A. I can't recall.
15 Q. You attach a number of websites to your
16 declaration.
17 Did you look at any other websites that
18 you didn't attach?
19 A. In this matter regarding these pages,
20 no, I did not.
21 Q. And how many hours did you spend
22 reviewing the websites on display inspection
23 repair?
24 A. Do you mean specifically these
25 approximately eight websites listed on these

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1 pages?
2 Q. Yeah.
3 A. Not many, one hour.
4 Q. Would you consider that hour to make you
5 an expert in TFT LCD repair?
6 MR. SCHLITTER: Objection, foundation.
7 THE WITNESS: I can't agree with that
8 characterization of the time or if that would be
9 sufficient. No, it's my general -- my own
10 experience and my research with the processes that
11 are listed here, my familiarity through my
12 students' work or my own personal work that
13 enabled me to read the websites and understand
14 what's being talked about and fairly quickly form
15 an opinion on the text that's largely represented
16 here.
17 BY MR. GIBSON:
18 Q. But you would agree that just reviewing
19 some websites wouldn't make you an expert on TFT
20 LCD repair?
21 MR. SCHLITTER: Objection, form.
22 THE WITNESS: To be an expert, one of
23 expert skill in the art of LCD fabrication takes
24 much more than an hour of reviewing websites.
25

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1 BY MR. GIBSON:
2 Q. Now, would you expect that the websites
3 would -- say the LG website or the CPT website,
4 the first two that you mentioned, that they would
5 publicly disclose their proprietary information
6 related to the display module repair procedures?
7 A. I would not expect any company to -- if
8 they were smart, to disclose proprietary
9 information about any of their processes,
10 including repair operations.
11 Q. And do you have any knowledge of the
12 proprietary information from LG -- LG or CPT on
13 the repair process?
14 A. I do not.
15 Q. And do you know if the equipment used in
16 display repair is exactly the same as that used in
17 display production?
18 A. I'm not aware of that kind of
19 requirement, but I am aware that as I looked into
20 the literature for any mention anywhere in journal
21 literature, conference proceedings or the patent
22 literature on a repairing operation, that there
23 was very little disclosed at all.
24 Q. Is that because most of it's proprietary
25 or do you know?

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1 A. I don't know. That's one possibility.
2 Q. So you don't know whether the equipment
3 used in the display repair is exactly the same as
4 that used in the display production?
5 A. I think it's unlikely that it is exactly
6 the same, but it also is not likely some magic box
7 that's not disclosed anywhere else. And the tools
8 to form metals and the kinds of conductors and
9 insulators that are referred to in -- in the
10 patent, those processes are pretty well-known and
11 they have fundamental laws of physics that limit
12 the temperatures and pressures that can be used in
13 forming those layers, and those are well-known in
14 the fabrication process.
15 Q. And are they well-known to you in the
16 display repair process?
17 A. They're well-known to me in the display
18 fabrication process, but those same physical
19 limitations would apply to the repair process.
20 Q. Do you know how many displays can fit
21 onto a piece of a glass substrate?
22 MR. SCHLITTER: Objection, foundation,
23 form.
24 THE WITNESS: Of course it depends.
25

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1 BY MR. GIBSON:
2 Q. And do you have a range of how many?
3 A. The literature's pretty clear that it
4 can be anywhere from one to arrays of various
5 sorts. I've -- I recall seeing large TVs being
6 formed in a grid of three-by-three, sometimes
7 four-by-three. Smaller displays can be formed in
8 larger arrays than even that.
9 Q. And so you said "it depends."
10 What do you mean, what does it depend
11 on?
12 A. The number of displays formed on a
13 particular mother substrate would depend on the
14 size of that substrate and the size of the
15 eventual product that's being produced and the
16 processes that are being used to produce them, the
17 generation of the LCD fab line.
18 Q. And would you agree that the production
19 equipment that is made to handle large -- large
20 sized glass substrates with many individual
21 displays all made in parallel onto that same
22 substrate?
23 MR. SCHLITTER: Objection, form.
24 THE WITNESS: I can't agree to that.
25 What I -- that's -- it's not required to be so.

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1 There are, I'm sure, many fabrication lines that
2 are smaller than that and that produce one display
3 at a time.
4 BY MR. GIBSON:
5 Q. Do you know any that do that?
6 A. I do. Some of my partners that I work
7 with through ImagineOptix, I've seen them myself.
8 Q. And are these actual products that are
9 commercialized and sold?
10 A. As you can appreciate, when a new
11 product comes out, the first step is a prototype
12 and then the next step is typically a limited
13 production run. And most of the time a smaller
14 fabrication facility is used for that. I've --
15 I've toured one in Korea. And in that case, I
16 think it is common, depending on the size of the
17 display, that it's a single display that's being
18 produced.
19 So for the first few months of the
20 production, it might be a few thousands every
21 month and then as it ramps up and there's
22 customers for it, then there's a general trend to
23 transfer that to a more sophisticated and higher
24 throughput factory.
25 Q. In that situation we're talking about a

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1 mainstream commercial product.
2 Wouldn't you agree that the production
3 equipment is going to have a large size glass
4 substrate with many individual displays --
5 MR. SCHLITTER: Objection, form,
6 foundation.
7 BY MR. GIBSON:
8 Q. -- that are being made all in parallel?
9 A. That's simply not required. The first
10 few months that I just mentioned, those are real
11 commercial products. Some of the devices we have
12 could have been made on that -- that kind of line.
13 So I can't agree with that characterization that
14 that's either necessary or required, but it may be
15 typical.
16 Q. Yeah. And my answer -- my question
17 rather, wasn't whether it's required. My question
18 is directed to what is typical, you know, in large
19 scale production.
20 A. Every large scale process of a product
21 that I have -- that I'm aware of begins with a
22 small production line process with typically one
23 -- one or a small number at a time.
24 That's -- the partners I work with have
25 exactly that. But as soon as they can, if

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1 customers justify it, there is a transfer to a
2 higher throughput line where you do have parallel
3 -- or you have multiple displays being produced in
4 parallel essentially through the line.
5 Q. Or you have the larger size glass
6 substrate with multiple displays?
7 A. That's right. And to your question
8 then, in the commercial products, both can appear.
9 Results from both can appear.
10 Q. Now, would you agree that the equipment
11 that's used to repair a display will be different
12 than the equipment that's being used when you have
13 a large scale production where you've got a larger
14 substrate that's -- where you're using multiple
15 displays, producing multiple displays?
16 A. You're asking me to speculate.
17 Q. No, I'm asking from your own knowledge,
18 if you know.
19 MR. SCHLITTER: Object to the form and
20 foundation.
21 THE WITNESS: Well, what I know is what
22 I've -- what I've written in here, right, that the
23 processes that are used to fabricate that involve
24 high temperature and low pressure are
25 inappropriate to be used in a repairing operation

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1 because they damage the whole display that's
2 already produced and being repaired. So they --
3 they would not -- it would not be possible to use
4 those for the repair operation.
5 I also know that there are limits on the
6 ability to create these layers that are
7 fundamental to the materials themselves and to
8 basic physics. So I can't even imagine another
9 way, for example, to form a high quality ITO layer
10 without having elevated temperatures and most
11 likely vacuum. You could -- you could deposit the
12 atoms, but they wouldn't conduct in the way that's
13 necessary for this application.
14 BY MR. GIBSON:
15 Q. Okay. I don't think that was an answer
16 to my question. My question is directed toward
17 repair.
18 And wouldn't you expect that the
19 equipment that's aimed to repair a display will
20 only handle one display at a time?
21 MR. SCHLITTER: Objection, foundation.
22 THE WITNESS: I have no reason to -- to
23 expect that. It could be that. It depends
24 otherwise.
25

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1 BY MR. GIBSON:
2 Q. Are you aware of any equipment that's
3 used to repair multiple displays at one time?
4 A. I can't recall if that was within the --
5 what I've -- what I've seen. The very few papers
6 that I noticed that mention repair at all do not
7 -- I just don't recall what they said.
8 Q. The Pascal website that's mentioned in
9 your paragraph D --
10 A. I see paragraph D. Is the attachment
11 included here?
12 Q. Unfortunately not. And if we -- if you
13 need those, then we'll have to -- I don't know if
14 you have them handy, but we need to get a copy of
15 them.
16 MR. SCHLITTER: I could -- I could get
17 them. I'm not sure that I have them handy.
18 THE WITNESS: It depends most likely on
19 your question.
20 BY MR. GIBSON:
21 Q. And we may -- we may need them for this
22 question.
23 The Pascal website, does it describe a
24 process that is aimed at displays from what you've
25 written?

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1 A. I'd have to see the website printout to
2 know for sure.
3 MR. GIBSON: Okay. Maybe we can take a
4 break and if I can indulge you to grab his
5 exhibits?
6 VIDEOGRAPHER: We're going off record.
7 The time is 11:48.
8 (Short recess.)
9 VIDEOGRAPHER: We're now back on record.
10 The time is 11:56. Please continue.
11 BY MR. GIBSON:
12 Q. All right. We'll come back to that once
13 we have the documents.
14 In general, in the fabrication of
15 display products, how important is it to conserve
16 space?
17 MR. SCHLITTER: Objection, form.
18 THE WITNESS: What space are you
19 referring to?
20 BY MR. GIBSON:
21 Q. Well, the space in the structure itself.
22 MR. SCHLITTER: Same objection.
23 THE WITNESS: I still don't have enough
24 information to answer your question.
25 Can you point me to a figure? Which

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1 space or -- what space are you referring to in the
2 fabrication of a display product?
3 BY MR. GIBSON:
4 Q. Well, in the -- in the multi-layer
5 terminal portion, is it important to conserve
6 space?
7 MR. SCHLITTER: Objection, form.
8 THE WITNESS: It depends.
9 BY MR. GIBSON:
10 Q. What does it depend on?
11 A. Well, there are various trade-offs that
12 go into the design of a terminal portion.
13 Certainly there are the technical trade-offs, but
14 there's also the considerations of cost and the
15 availability of the elements involved, especially
16 the FPC.
17 So it depends on all those on whether --
18 you know, whether the area in space and size of
19 the terminal is larger or smaller.
20 Q. Do the display producers try to have a
21 large border region around the TFT array or do
22 they try to minimize the edge area?
23 A. In general it is not an objective to
24 maximize the area around a display area, that's
25 true.

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1 Q. And why is that?
2 A. I think simply because it is visually
3 unpleasing to most consumers and customers. We,
4 even at the time of 1997, expect that what we're
5 going to see is the display with a frame or border
6 around it that's modest in size compared to the
7 display.
8 Q. And are you familiar with the different
9 generations of glass substrate size that were in
10 production?
11 A. I'm in familiar -- excuse me. I am
12 familiar with the general ideas of those
13 generations, but not the specific sizes in those
14 generations. I don't recall that.
15 Q. Do you know how many displays were
16 produced on a given glass substrate of a given
17 generation, or that's something you don't know?
18 MR. SCHLITTER: Objection, foundation.
19 THE WITNESS: I don't recall that. I've
20 certainly seen that kind of description, but I
21 don't remember those kind of details.
22 BY MR. GIBSON:
23 Q. What about in 1997, do you know what was
24 the state of the art in glass substrate size that
25 was in production as of 1997?

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1 A. I don't recall the substrate size at
2 that point.
3 Q. Do you know how large a Gen 3 glass
4 substrate is?
5 A. I suspect there's some variation in that
6 size, but I don't recall even what that typical
7 answer would be.
8 Q. Do you know how large the glass
9 substrate is of a Gen 8, 9 or 10?
10 MR. SCHLITTER: Objection, form.
11 THE WITNESS: I don't recall
12 specifically, but those are the more -- I
13 understand that to be more recent generations and
14 so they're likely larger than the previous
15 generations.
16 BY MR. GIBSON:
17 Q. Would you have any knowledge of how many
18 14-inch displays could fit on a Gen 3.5 versus a
19 Gen 8?
20 A. I can't recall any specific answer to
21 how many would be on those -- those generations.
22 Q. Do you know how the total area that a
23 display occupies, i.e., the TFT array plus the
24 border region that contains the terminals for
25 connecting to the FPC, how is that related to the

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1 number of displays produced on a given glass
2 substrate?
3 A. It depends.
4 Q. What does it depend on?
5 A. It would depend on the size of the
6 final display/display area and the number that
7 would be implemented there. It also depends on
8 the design of the terminal region for a particular
9 manufacturer. I don't think there's one answer to
10 that.
11 Q. If the border area around a TFT array
12 increases, how does that affect the total number
13 of displays produced per glass substrate?
14 MR. SCHLITTER: Objection, form,
15 foundation.
16 THE WITNESS: Well, in general, if you
17 begin from a certain number of displays on a
18 substrate, for example, four-by-three and you
19 increase the border region of that, then at some
20 point the increase of the border region will
21 require you to have less than the four-by-three
22 grid of those displays.
23 BY MR. GIBSON:
24 Q. So you would like to decrease the border
25 region to avoid that, correct?

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1 A. Most of the time I think that's the
2 case. You would want to do whatever you can to
3 minimize that border region.
4 Q. And one of the ways you could minimize
5 that border region is to put the sealant as close
6 as possible to the terminal region, correct?
7 A. I think that is -- that one of ordinary
8 skill would see that as one of the options
9 available.
10 Q. If a -- if a terminal region is located
11 a large distance from the sealing region, how
12 would that affect the series resistance?
13 MR. SCHLITTER: Objection, form.
14 THE WITNESS: I think you're going to
15 have to tell me what you mean by "terminal
16 region." There could be many answers to what that
17 is.
18 So what do you mean by "terminal region"
19 before I continue answering questions on this.
20 BY MR. GIBSON:
21 Q. Or terminal portion, would you be more
22 comfortable than that?
23 A. Could you show me one so I can talk
24 about it in relation to a figure?
25 Q. Well, if you look at -- I think you used

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1 the words in paragraph 127 of your declaration.
2 A. Okay. I see terminal portion here.
3 Q. And what were you referring to as the
4 terminal portion?
5 A. Well, this paragraph is referring to
6 Dr. Hatalis' declaration and in this paragraph,
7 I'm addressing his assertion that it would be
8 obvious to a person of ordinary skill to place the
9 sealant over the wirings that are in the terminal
10 portion, the second wirings in particular. And
11 I --
12 Q. So if we look at Sukegawa, for example,
13 can you tell me what terminal portion you were
14 referring to?
15 A. Sure. Specifically in Sukegawa, we have
16 several figures that say "terminal portion."
17 Well, to be clear, Fig. 3C has arrows that say the
18 directions to the terminal portion and then many
19 of the other figures that show the FPC, for
20 example, Figs. 2, all of them, Fig. 3B, Fig. 3A,
21 Fig. 3E and later figures, they show the terminal
22 -- what Sukegawa would, I think, call the terminal
23 portion.
24 Q. Okay. So if we talk about that as our
25 -- as our terminal region, if that's located a

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1 large distance from the sealing region, how does
2 that impact the series resistance?
3 MR. SCHLITTER: Objection, form.
4 THE WITNESS: The basic principle of
5 resistance is that when a conductor is longer than
6 the resistance of that conductor or that
7 connection will be higher. However, I don't think
8 anybody in this case is saying that you're going
9 to put the terminal portion a country mile away
10 from the display portion.
11 We're really referring to what Sukegawa
12 is actually disclosing and that is what I was
13 referring to, as well as I think Nakamoto, with
14 regard to the conductors that are shown in the
15 terminal portion, and the terminal portion is not
16 limited -- the terminal portion is more than just
17 those conductors, as is shown in Sukegawa.
18 BY MR. GIBSON:
19 Q. So you would agree though that
20 resistance is proportional to the length of the
21 line, correct?
22 A. It is.
23 Q. So one way to reduce the resistance of
24 the line is to reduce the length?
25 MR. SCHLITTER: Objection, foundation.

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1 THE WITNESS: Are you -- are you asking
2 in a specific context or just as a general
3 principle?
4 BY MR. GIBSON:
5 Q. General principle.
6 A. As a general principle, it is true that
7 if you shorten a conductor, then the resistance is
8 lowered.
9 Q. And if we look at Fig. 9 of Nakamoto --
10 A. I've got it.
11 Q. -- would you agree that in Fig. 9,
12 Nakamoto is contemplating running a
13 multi-conductor wiring from the terminal portion
14 into the display portion?
15 A. Nakamoto in Fig. 9 shows two layers, G1
16 and D1, which are both conductors, and that is
17 running from underneath the tape carrier package
18 I think it's called in Nakamoto -- across the
19 sealant into the display area.
20 Q. And that's the metal G1 and the ITO
21 layer, D1?
22 A. That's what I'm referring to.
23 Q. And would you agree that D1 is the outer
24 top metal in contact with the -- with ACF?
25 MR. SCHLITTER: Objection, foundation,

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1 form.
2 THE WITNESS: I can't -- I can't agree
3 with that mainly because D1, if it's ITO, is not a
4 metal. It's a conducting oxide. So it is the top
5 conductor in connection with the ACF, but it is
6 not a metal.
7 BY MR. GIBSON:
8 Q. Okay. Well, you would agree that D1 is
9 the outer top and it is in contact with the ACF?
10 A. Let me make sure. Just take a moment.
11 Yeah, I think that's the case. The
12 layer immediately above layer D1 is the
13 anisotropic conducting film.
14 Q. Which is referred to as ACF in Fig. 9 of
15 Nakamoto?
16 A. I was looking for that. I can't find
17 the label.
18 Q. I think it's at the bottom.
19 A. Ah, okay.
20 Q. Is that right?
21 A. Yes, thank you. So the ACF is in direct
22 contact with D1.
23 Q. Would you agree that Nakamoto is
24 directed to the field of liquid crystal displays
25 and a means to provide reliable connections to

24 (Pages 90 - 93)

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1 scan lines and data lines via wiring on the glass
2 substrate connections to an FPC?
3 A. That's a long question.
4 MR. SCHLITTER: Objection, form.
5 THE WITNESS: I certainly can agree that
6 Nakamoto is directed to the field of liquid
7 crystal displays. I would have to read this --
8 remind -- refresh my memory on the specification
9 if it -- if it does disclose that it is intending
10 to provide a means for reliable connections to
11 scan lines.
12 BY MR. GIBSON:
13 Q. Okay. So without reviewing the patent
14 again, you don't -- you don't know the answer to
15 that?
16 A. I don't recall if that's explicit in
17 Nakamoto.
18 Q. What about Sukegawa, same question?
19 A. Well, Sukegawa also is certainly
20 directed toward liquid crystal displays. And what
21 I recall the primary objective of Sukegawa being
22 is a -- is the disclosure of a means to provide
23 corrosion resistance in the -- from the terminal
24 portion or in the terminal portion and especially
25 around the checking terminal.

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1 Q. And that's because you want to have a
2 reliable connection?
3 MR. SCHLITTER: Objection, form.
4 THE WITNESS: You're asking me -- are
5 you asking me if I think it's good to have a
6 reliable connection in LCDs? Of course.
7 BY MR. GIBSON:
8 Q. Well, and that's what Sukegawa is
9 directed to?
10 MR. SCHLITTER: Objection, form.
11 THE WITNESS: I'd have to read it
12 carefully to see whether or not he explicitly
13 speaks of a reliable connection. I just can't
14 recall.
15 BY MR. GIBSON:
16 Q. Looking at a -- again, in Nakamoto in
17 Fig. 9, would you agree that the placement of the
18 sealant there is an example of where you can place
19 sealant?
20 A. Nakamoto Fig. 9 certainly shows one
21 example of where to place sealant and I think is
22 fairly representative in this sense that the
23 sealant is placed recessed back from the edge of
24 the counter substrate.
25 Q. So you think it's a good example or

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1 fairly representative?
2 A. I don't want to characterize it as good
3 or not. It is one example, one option.
4 Q. And it's a viable option?
5 A. Certainly Nakamoto thought so.
6 Q. Do you disagree with it?
7 A. I don't have any reason to disagree with
8 Nakamoto's placement of the seal.
9 Q. If we look at Fig. 5 of Nakamoto, would
10 you agree that the sealant region is formed on top
11 of PSV1?
12 A. I'm not sure that's shown in Fig. 5,
13 right. It's especially shown by combining Fig. 5
14 with Fig. 9. So let me make sure. I'm looking.
15 Is PSV1 the orientation layer? I'd have to remind
16 myself what PSV1 is.
17 Q. PSV1 is the oxide silicon film. Go
18 ahead. If you want to look at -- I think it's
19 paragraph 89 that describes, if that helps.
20 A. It's called the protective film. Yeah.
21 And it can be made in oxide silicon films or
22 nitride silicon films. So that's clearly an
23 insulator. And your question is whether or not
24 that appears below the sealant?
25 Q. Yes, if the sealant region is formed on

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1 top of PSV1?
2 A. It appears that Fig. 9 is showing PSV1
3 as partially going under the sealant.
4 Q. And from Fig. 5?
5 A. It's unclear to me if Fig. 5 shows the
6 sealant going around what's labeled as PSV1 or
7 it's going on top of.
8 Q. You can't tell?
9 A. I don't think you can tell from Fig. 5.
10 Q. But you think Fig. 9 discloses that it
11 is underneath the sealant?
12 MR. SCHLITTER: Objection, form.
13 THE WITNESS: Well, it's not clear from
14 Fig. 5, which is the top-down view, which would
15 show the plan regions of those two layers. Fig. 9
16 shows a cross-section that may or may not be a
17 realistic cross-section and it does show, as
18 drawn, a layer labeled PSV1 that is underneath the
19 sealant.
20 But I do want to note that in at least
21 one of the other patents, we have a cross-section
22 which is very misleading and I can't tell if
23 that's the case here where in the cross-section,
24 things are being labeled that aren't actually in
25 the same cross-section.

25 (Pages 94 - 97)

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1 BY MR. GIBSON:
2 Q. But you don't know one way or the other
3 whether that's happened here in Fig. 5?
4 A. In Fig. 5 it's hard to tell. If you
5 want to identify for me where the boundaries of
6 PSV1 are, then perhaps I could answer you better.
7 But from the black and white drawing at
8 the moment, it's -- it's not apparent to me
9 whether the seal, which is labeled, is going on
10 top of what appears to be labeled PSV1. It's a
11 square with a circle in it, again whether it's
12 going on top or whether it's going around.
13 Q. Would you understand that the PSV1 is
14 going from the -- from the right -- looking at the
15 right of the figure, there's two horizontal lines
16 that extend toward the square with the circle in
17 it.
18 Would you understand that the PSV1 is
19 going to be extending -- going from the right to
20 the left toward that square with a circle going
21 around it --
22 MR. SCHLITTER: Objection.
23 BY MR. GIBSON:
24 Q. -- and then going down to the bottom of
25 Fig. 5?

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1 MR. SCHLITTER: Objection, form.
2 THE WITNESS: I don't think that's my
3 understanding. I may misunderstand what you've
4 just said and it would be helpful if you drew it
5 for me so I can really respond to your question.
6 But it sounds like what you've just described is
7 the seal region -- or the sealant. I'm sorry.
8 The sealant comes in from the right
9 side. It's two parallel lines and then it comes
10 over and goes around that square and then comes
11 down to its label, SL.
12 BY MR. GIBSON:
13 Q. We'll the sealing region is much broader
14 than that, right? The sealing region up almost
15 half of what we're seeing here in Fig. 5, correct?
16 MR. SCHLITTER: Objection, form.
17 THE WITNESS: I don't agree with that.
18 The seal or the sealant is labeled SL. It's got
19 specific locations in both Fig. 5 and Fig. 9. The
20 seal region is something different altogether and
21 I'm not sure that's labeled here in Nakamoto. In
22 another reference it is, but not here.
23 BY MR. GIBSON:
24 Q. So let me make sure I understand.
25 If you were to draw in there where you

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1 think the sealant is -- maybe you could do that
2 for me. I don't know if you have a pen.
3 A. I can if you --
4 Q. You don't have a pen?
5 A. -- provide -- no, I'm sorry.
6 Q. You can use mine as long as you promise
7 to give it back.
8 A. Okay. So you're asking me to identify
9 the seal?
10 Q. Where the sealant is.
11 A. Okay.
12 Q. I know where the SL is. I see where
13 the -- where that is. I don't need you to
14 identify the letters SL, just where you think the
15 sealant would be and then next, I'd ask you to
16 identify the sealant region.
17 A. Well, we can begin with following that
18 label and identifying the seal, SL, in Fig. 5 and
19 I think that's an answer to your question.
20 Q. Okay. Now -- yes, and that's -- that's
21 what I understand as well.
22 Now, what is the -- where is the PSV1?
23 A. Well, you and I both can see it's
24 labeled and it has a line going from the text that
25 seems to point to the inside of a box that's

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1 square with a circle in it.
2 Q. All right. So you wouldn't understand
3 that PSV1 actually extends from the left -- I'm
4 sorry -- from the right of Fig. 5 to the left and
5 then is actually overlapping the sealant?
6 A. Well, I guess now that I'm looking at
7 this, I notice that there's two labels for PSV1,
8 right. There's one kind of in the middle and then
9 there's one in the -- more toward the bottom left.
10 Q. Right. That's my -- yes. And my
11 question is that's what I'm trying -- I was
12 focusing on the one that's in the bottom left.
13 And you're focusing on the one that was --
14 A. I was.
15 Q. So my question was, when we're looking
16 at the right side of Fig. 5, the PSV1 is going to
17 be extending to that line on the left side that is
18 labeled PSV1?
19 MR. SCHLITTER: Objection, form.
20 THE WITNESS: From other figures we can
21 see PSV1 as a layer in, for example, Fig. 4 above
22 or as part of the TFT. So I certainly can agree
23 that there must be PSV1 in the bottom right of
24 Fig. 5.
25 What's not clear is what's going on with

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1 the lines in between. And there's two cuts in
2 particular that are important, there's CT1 and CT2
3 and those are going to be -- those are identified
4 as the cutting regions where the two substrates
5 are going to be diced. And again, I see the PSV1
6 labels, but I can't see where they end. I can't
7 tell from this figure.
8 BY MR. GIBSON:
9 Q. All right. So based on your
10 understanding, they may or may not overlap the
11 sealant, PSV1?
12 A. Well, based on Fig. 5, it's not clear to
13 me. As I've already said, Fig. 9 shows it
14 partially, only partially under the sealant.
15 Q. And the PSV1 that's on the left -- the
16 left lower part of Fig. 5, doesn't that show you
17 the extent of the overlap, that there's going to
18 be PSV1 to that point?
19 A. Well, if that were the case, it would be
20 inconsistent with Fig. 9, right. Fig. 9 shows a
21 sealant where the right side does have PSV under
22 part of it, but the left side does not.
23 And if we look at Fig. 5 and look where
24 the sealant is, what you're suggesting to me is
25 that the PSV1 just goes underneath the whole --

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1 from -- from that line in the middle left side of
2 Fig. 5 all the way to the right and that can't be.
3 It has to end somewhere, right, because Fig. 9
4 shows an example of where that is. So I can't
5 tell from this figure, this top-down, black and
6 white illustration where those ending points are.
7 Q. Well, there can be multiple embodiments
8 of a patent, right?
9 A. Yes.
10 Q. Do you know if Fig. 5 and Fig. 9 are the
11 same embodiment?
12 A. I don't recall if Nakamoto describes it
13 that way.
14 Q. Okay. So you can't tell where the
15 passivation layer ends from Fig. 5?
16 A. Fig. 5 is not clear on where is
17 passivation layer and where is not, PSV1. It
18 certainly is clear, even in Fig. 5, that you have
19 terminals, right. There's DTM terminals and then
20 there's GTM terminals. And clearly PSV1 is an
21 insulator that's applied after all of the
22 conductors are deposited.
23 So all of the conductors have been
24 deposited before. So to have an electrical
25 connection to those gate and drain lines, the PSV1

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1 would have to be removed at least partially. So
2 Fig. 5 shows I think that, but it's not clear what
3 else it's showing of where else PSV1 is being
4 removed.
5 Q. All right. But you would know that the
6 PSV1 is not over the DTM or the GTM?
7 MR. SCHLITTER: Objection, form.
8 THE WITNESS: Well, it's not shown in
9 Fig. 9. I can't imagine a way to contact to those
10 terminals if it was allowed to remain there in the
11 final product. Clearly this Fig. 5 is an
12 intermediate step, right, because it still has
13 display substrates that haven't been cut to their
14 final form. So the status of that in Fig. 5 is
15 not clear at all to me.
16 BY MR. GIBSON:
17 Q. Would you agree that the PSV1 layer is
18 approximately 1 micron thick?
19 A. I can agree that that's a typical
20 thickness of a passivation film. I don't recall
21 if Nakamoto specifically identifies thickness.
22 Q. Let's look at paragraph 90.
23 A. Paragraph 90 points to PSV1 as being
24 made approximately 1 micron film thickness.
25 Q. And if you look at paragraph 91, which

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1 is discussing Fig. 5, does that help you
2 understand the extent of PSV1?
3 A. I'll take a minute and read it
4 carefully. Okay. And can you remind me your
5 question?
6 Q. Doesn't that inform you that -- as you
7 said, PSV1, it's going to be laid over and then
8 it's going to be cut back, right?
9 A. Openings are going to be formed in it.
10 Q. Openings are going to be formed in it.
11 And it's desirable to leave as much of
12 the PSV1 in place as possible, right?
13 A. It depends. The disclosure in
14 paragraph 91 describes removing it from certain
15 parts. There's, I think, no teaching, explicitly
16 at least, that you have to leave it everywhere
17 else or that -- or that he prefers to do that
18 even.
19 Q. Well, what's going to happen is there's
20 going to be a PSV1 that's going to -- when it's
21 laid down is going to cover up the GTM and the
22 DTM; it's going to -- it's going to cover a large
23 part of Fig. 5?
24 A. When it's deposited, it should cover the
25 entire substrate that's below.

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1 Q. And then he's -- then Nakamoto's
2 disclosing what is going to be cut back in order
3 to open up certain connections, correct?
4 A. He's disclosing in at least one example
5 the openings that he would create.
6 Q. And he also discloses he wants to have
7 the PSV1 cover as large a range -- cover large
8 ranges, as large a range as possible, correct?
9 MR. SCHLITTER: Objection, form,
10 foundation.
11 THE WITNESS: Could you point me to that
12 disclosure?
13 BY MR. GIBSON:
14 Q. Look at paragraph 93.
15 A. Well, his paragraph 93 says what it
16 says.
17 Q. Right. And as one of ordinary skill in
18 the art, you understand that you want to leave as
19 much of the PSV1 in tact as possible?
20 A. I can agree that a person of ordinary
21 skill will be inclined to leave the layer present,
22 but it does depend on the design on whether that's
23 an advantage or preferable or not.
24 Q. But in Fig. 5, that's what he's teaching
25 to leave as much of it as possible and you're

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1 going to open up the DTM and the GTM, right?
2 A. Well, in paragraph 91 through apparently
3 93 at least, he's disclosing what he's doing with
4 this PSV1 layer. He applies it through the whole
5 substrate. It generally has to be done that way
6 and then openings are created. Clearly he wants
7 to contact the conductors at the terminal regions
8 and those conductors which connect to the upper
9 portion.
10 And beyond that, in 93, he's pointing
11 out that his intention is to cover an area that's
12 larger than the gate insulation film G1 so that it
13 can cover the peripheral areas. That's what it
14 says. That's his disclosure. I have no reason to
15 disagree with that, but I would not generalize
16 that to an important principle that one of
17 ordinary skill would follow.
18 Q. Doesn't that show you that in Exhibit 5
19 that the PSV layer is going to be over what you've
20 drawn as the sealant? Isn't that explicitly
21 taught by Fig. 5 and the paragraphs that
22 correspond to it?
23 A. I can't get there from this. I can't
24 see Fig. 5 and identify all of the openings that
25 are formed.

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1 I do see in Fig. 9 an instance where
2 there's an opening underneath the sealant that's
3 been formed, and PSV1 is only over part of it. I
4 don't see Nakamoto limiting it to just those.
5 Q. What he teaches is just removing it over
6 the DTM and GTM?
7 A. His disclosure's not limited to that.
8 He also opens it up over the regions that relate
9 to the silver paste, AGP. It's that square or
10 it's -- it's in that region with that square and
11 the second label of PSV1.
12 And so it sounds to me like you want me
13 to speculate on where else he's making openings.
14 I don't know. He's identified at least three in
15 this one figure.
16 Q. Okay. But those are the only three he's
17 identified, the box with the circle, and then the
18 DTM and GTM? He doesn't identify any others,
19 correct?
20 A. In the text and in Fig. 5, he doesn't
21 identify any others because -- yeah.
22 Q. Now, in view of Fig. 5, where does the
23 -- where do the DTM lines run?
24 A. Well, we see the DTM lines at the top of
25 the figure, top right.

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1 Q. Right.
2 A. And it's the series of vertical wirings.
3 Q. And where do they stop?
4 A. Well, the figure shows that they're
5 long -- vertically long traces with a smaller
6 width and they -- at least some of them go from
7 what is the terminal where the FPC will connect,
8 as shown in Fig. 9, and then proceed, some of
9 them, across the seal on the upper side of the
10 display and then into the display region. I think
11 it's called AR.
12 Q. And where -- the GTM lines, where do
13 they extend?
14 A. The GTM lines are on the orthogonal side
15 of the substrate. They're in the bottom left of
16 Fig. 5 and they have their own terminals, of
17 course, and they extend from that terminal from
18 left to right and at least some of them go across
19 the sealant and also access the display area AR
20 and each of those, of course, form independently
21 connection to the TFT array, the gate and the
22 drain.
23 Q. And do any of the GTM lines overlap the
24 DTM lines?
25 A. In Fig. 5, none of those lines overlap

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1 outside the seal or under the seal. If they ever
2 cross, it's in the TFT, the display portion.
3 Q. If you look at Fig. 9, would you agree
4 that -- we've talked about it discloses a sealant.
5 Do you also see that it discloses a
6 signal line?
7 A. It discloses a DTM, so what I understand
8 to be the drain terminal. I think I'll need to
9 refresh myself on the labels just for a moment.
10 Q. Sure. I need to get my pen back too.
11 A. Sorry.
12 Q. Here's one if we need one later.
13 A. Okay. The signal lines are identified
14 as DL.
15 Q. Right.
16 A. And DL is labeled in Fig. 9.
17 Q. And that's the -- the DL is under the
18 sealant?
19 A. The element identified as DL seems to go
20 from the left of the bottom substrate across under
21 the sealant to the right side.
22 Q. And the DL line, it connects to an
23 external tape carrier package, the TCP?
24 A. When you say "connects," how do you mean
25 connects? Clearly there's an electrical

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1 connection.
2 Q. Yes. There's an electrical connection?
3 A. So whether or not there's a direct
4 connection, I'd have to study a bit more if that's
5 what you're asking me about.
6 Q. You would agree there's an electrical
7 connection?
8 A. There is an electrical connection from
9 DL to what's identified as DTM and the FPC that's
10 shown in Fig. 9.
11 Q. In Fig. 9, the ITO layer, which is that
12 one?
13 A. The ITO layer is D1 in Fig. 9.
14 Q. All right. And would you agree that
15 that layer is in contact with the tape carrier
16 package?
17 A. Again, contact -- which kind of contact
18 are you referring to, the electrical contact or
19 direct contact?
20 Q. We'll start -- is it an electrical
21 contact?
22 A. If the tape carrier package here is
23 defined to include the conductors on the tape
24 carrier package, then yes, the layer D1 is
25 electrically connected. That's the whole point of

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1 the terminal region.
2 Q. Would you understand the tape carrier
3 package to be the same thing as an FPC?
4 A. In general, I would.
5 Q. Let's look at the '413 patent for a
6 moment, which you should have in front of you.
7 A. I've got it.
8 Q. It's Exhibit 1001. If you look at
9 Claim 1 --
10 A. Got it.
11 Q. -- and Claim 1 discusses first and
12 second wirings that extend under the sealant, is
13 that correct?
14 A. Well, to be precise, it says, "A sealant
15 over a first wiring and a second region of a
16 second wiring."
17 Q. So you would expect there to be a first
18 wiring and a second wiring under the sealant,
19 correct?
20 A. I would expect it to be --
21 Q. In that region?
22 A. -- under the sealant at least partially
23 in that region.
24 Q. Would you agree that the claims don't
25 specify whether those wirings are side by side or

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1 stacked?
2 A. I disagree. I think that Claim 1
3 clearly teaches that it must be overlapping, at
4 least partially. After all, it has in the claim
5 element -- it says the second wiring overlaps at
6 least part of the first wiring and it refers to
7 all the others as being over each other.
8 MR. GIBSON: If we're at 10 minutes, why
9 don't we go ahead and change the tape.
10 VIDEOGRAPHER: We're going off record.
11 This is the end of Media Unit Number 2. The time
12 is 12:42.
13 (Whereupon, the deposition in the
14 above-entitled cause was recessed to
15 1:47 p.m. this date.)
16
17
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25

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1 AFTERNOON SESSION
2 VIDEOGRAPHER: We're now back on record.
3 This is the beginning of Media Unit Number 3 in
4 the deposition of Dr. Michael Escuti and the time
5 is 1:47. Please continue.
6 EXAMINATION (Resumed)
7 BY MR. GIBSON:
8 Q. You understand that you're still under
9 oath?
10 A. I do.
11 Q. Did you have a chance to talk about your
12 testimony or substance of your testimony with
13 anyone at any of the breaks today?
14 A. I've not talked about this deposition or
15 my testimony at all.
16 Q. And we were covering some of the organic
17 materials in the TFTs that you used.
18 What are some of the advantages of using
19 organic materials?
20 A. As opposed to what?
21 Q. Inorganic.
22 A. The principal advantage is one of cost
23 in both the material itself and in the processing.
24 And that's why we have OLED displays rather than
25 LED displays in our phones that are made of

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1 inorganic materials.
2 Q. Any other advantages?
3 A. There's -- there are many other
4 advantages. Another one is that the device
5 structures that can be made with organic
6 semiconductors can often be substantially
7 different and more advantageous than it could be
8 otherwise.
9 For example, there are stacking
10 configurations that are possible and arrangements
11 of the layers in a way that's advantageous for a
12 particular display.
13 Q. Now, the '413 patent, would you agree
14 that that's directed to inorganic TFTs?
15 A. The '413 is not limited in that way.
16 Q. Are you aware of it describing any type
17 of organic materials used as the metal layers or
18 instead of the metal layers?
19 A. The '413 refers to the conductors and
20 the wirings as -- as being simply that, wirings
21 and conductors in the claims. One of the examples
22 that's given in the specification is aluminum.
23 Claim 2 includes aluminum. So the metals are --
24 need to be conductors at a minimum, right? I, and
25 one of ordinary skill, would not use an organic

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1 semiconductor to replace a metal generally.
2 (Documents marked previously as Exhibit
3 Numbers 2013 through 2020 were
4 presented.)
5 BY MR. GIBSON:
6 Q. Let's go ahead and look at the exhibits
7 that were attached to your declaration. I'm just
8 going to hand you the whole stack of them. It
9 will just be easier. Thank you for making a copy
10 of them or having a copy made. So if we --
11 MR. SCHLITTER: Just to be clear, I only
12 asked for the exhibits that were referenced in
13 that one paragraph, 161.
14 MR. GIBSON: And that's what I meant
15 to --
16 MR. SCHLITTER: Okay.
17 MR. GIBSON: -- say. So we're on the
18 same page. That's what I've handed him and that's
19 what I mean to ask him about at this point, not
20 the other exhibits or the appendices. I think
21 everything else is attached.
22 THE WITNESS: Which appendix do you want
23 me to turn to?
24 BY MR. GIBSON:
25 Q. Your exhibit --

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1 A. Yeah, which exhibit do you want me to
2 turn to?
3 Q. Why don't we start -- the 2015, which is
4 the ShinMaywa.
5 A. I see it. Can I take a moment to --
6 Q. Sure.
7 A. -- review it?
8 Okay. I've reviewed it again now.
9 Q. Okay. And would you agree with me that
10 this document is describing general purpose
11 coating equipment?
12 A. This document doesn't limit the purpose
13 of the instrument and techniques that it's
14 referring to.
15 Q. But what it's describing is general
16 purpose coating equipment, correct?
17 MR. SCHLITTER: Objection, form.
18 THE WITNESS: I think that's a bit too
19 broad. It's describing a thin film coating
20 technique with two specific evaporation methods.
21 There's -- I'm sorry, two specific deposition
22 methods, evaporation and sputtering. That's
23 not -- I wouldn't characterize that as a general
24 coating method.
25

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1 BY MR. GIBSON:
2 Q. Well, no. What's being discussed here
3 though is coating equipment? I mean, that's the
4 purpose of the equipment that's being discussed,
5 right?
6 A. I'll give what I think is the same
7 answer. It's discussing two specific methods of
8 creating films, one is evaporation; one is
9 sputtering. Those are not general coating methods
10 or equipment.
11 Q. Even though the document's titled "About
12 Vacuum Thin Film Coating System"?
13 A. Even though that's what the document is
14 titled.
15 Q. Would you agree that display repair is
16 not listed as a main application for this
17 equipment?
18 A. I can agree that display repair is not
19 explicitly mentioned at all.
20 Q. If we turn to the next exhibit, 2016,
21 which is the Pascal exhibit, if you want to take a
22 moment to refresh your memory on it, just let me
23 know when you're done.
24 A. Yes, thank you.
25 Okay, I've reviewed it.

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1 Q. Would you agree that the -- part of the
2 website that you've attached to your declaration
3 does not describe a process that is aimed at
4 displays?
5 A. It describes -- this document does not
6 explicitly mention displays. It's a document
7 about a technique of molecular beam epitaxy and
8 pulse laser deposition. It's silent on -- it does
9 mention some applications, but it's silent on
10 displays.
11 Q. Okay. And the website, it describes a
12 laser that's used for epitaxial materials,
13 correct?
14 A. I don't think it describes it. It
15 mentions that the process involves a laser. It
16 doesn't say very much about it.
17 Q. Okay. Do you understand that it's used
18 for epitaxial materials, a laser?
19 A. The laser is used to -- as a kind of
20 exciting energy to pulse the target and get the
21 target materials off of the target and then
22 through the rest of the process onto the substrate
23 that it's being deposited onto. And in this case,
24 it's being used in an epitaxial process.
25 Q. Okay. And are you aware that no

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1 epitaxial materials are used in flat panel
2 displays?
3 A. It's my understanding that epitaxial
4 growth is not a standard process.
5 Q. For flat panel displays?
6 A. For flat panel displays.
7 Q. Would you understand that the size of a
8 substrate that can fit into one of the lasers that
9 Pascal is describing is very small?
10 A. What do you mean by "very small"?
11 Q. Well, it would be smaller than your
12 standard flat panel displays?
13 A. What do you mean by "standard flat panel
14 display"? I think all of us have typical sizes.
15 Q. Well, what's your -- what's your
16 understanding of a standard flat panel display?
17 A. I don't think there is a standard size
18 for a flat panel display, even in 1997.
19 Q. And do you know if this laser was
20 available in 1997?
21 A. Well, as we said -- or as I just said,
22 there's not much detail provided in this document
23 as to that laser. I can speculate, but I'm not
24 sure how helpful that is.
25 Q. You don't know?

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1 A. Well, it's a -- it's a pulsed laser and
2 that's a family of lasers that have been
3 well-known for decades.
4 Q. What's the size of -- the largest size
5 substrate that could be used with this laser?
6 A. I'm not sure there is an answer to that.
7 It would mostly depend on the size of the chamber
8 that's, for example, illustrated in the first
9 figure. It's, in my view, less constrained by the
10 laser and certainly one could put multiple targets
11 and multiple lasers in conjunction to illuminate a
12 larger area if that was ever needed.
13 Q. But that's not what's being described
14 here, correct?
15 A. No, no. Multiple lasers and multiple
16 targets is not mentioned here.
17 Q. And you don't have an idea of what size
18 substrate could fit inside one of the Pascal laser
19 MBEs?
20 A. I don't have specific knowledge of what
21 size could be accepted inside.
22 Q. Do you have any knowledge of the size?
23 A. I don't have any specific knowledge of
24 the size, no.
25 Q. Do you know if these lasers are -- the

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1 Pascal laser MBE is ever used with displays, LCD
2 displays?
3 A. I don't know of any specific instance,
4 but that's not the purpose of these paragraphs or
5 why I included these websites. It was more a
6 general analysis responding to Dr. Hatalis'
7 comments about processes that might be used or
8 could be used. And so this is my brainstorming
9 attempt at imagining what he could be referring
10 to, and this is one that came to mind.
11 Q. Don't you think it would be important to
12 know whether this was actually ever used with
13 displays or not before including it in your
14 declaration that deals with LCD displays?
15 A. On this issue, no, I don't think it's
16 important.
17 Q. If we look at the next one,
18 Exhibit 2017, the Micro-Tec, do you want to
19 familiarize yourself again with that and just let
20 me know when you're --
21 A. Yes, thank you.
22 Q. --- done.
23 A. Okay. I've reviewed it.
24 Q. Would you agree that the equipment
25 listed is for products and not for repair?

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1 A. I'm not sure I can limit it in that way.
2 I don't agree. It's a document that describes
3 screen printing, which is common in LCD industry
4 for various purposes.
5 Q. Does it ever mention any type of repair
6 anywhere in the document?
7 A. To the best of my memory and to the best
8 of my review in these few minutes, it doesn't
9 mention repair at all.
10 Q. If we could look at the next one which
11 is Exhibit 2018?
12 A. Okay, I've reviewed it.
13 Q. And this is from the ULVAC website?
14 A. Yes.
15 Q. Would you agree that this -- the
16 equipment that's listed here is directed to
17 production of thin film solar cells?
18 A. In part it's explicitly mentioned that
19 an application is thin film solar cells, but it is
20 also representative of those systems that are used
21 to prepare LCDs.
22 Q. It doesn't mention in here that it's
23 intended for repair, correct?
24 A. What's mentioned is the ability of the
25 system to remove a transparent electrode with

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1 the -- with control over where and what size, what
2 amount is being removed. And that's indeed a very
3 standard product to repair TFT substrates,
4 especially at the time of 1997.
5 Q. Okay. But this document itself isn't
6 discussing any use of this equipment for repair,
7 correct?
8 A. It doesn't explicitly discuss that. It
9 also doesn't rule it out. And I'm providing this
10 document as simply an example of a tool that is
11 used for laser ablation and is a kind of tool that
12 is used in the LCD industry for repairs.
13 Q. Have you ever used any of the equipment
14 we've been talking about for repair?
15 A. I've used some of this for fabrication
16 and what I think of as repair, but admittedly not
17 in an industrial setting.
18 Q. If we turn to Exhibit 2019, this is the
19 MicroFab website document. If you want to take a
20 moment to familiarize yourself with that, let me
21 know when you're finished.
22 A. Yes, thank you. Okay. I've reviewed
23 it.
24 Q. And would you agree that the MicroFab
25 website and the pages you've attached at least

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1 does not list display repair?
2 A. It does not list display repair.
3 Q. Would you agree that these products are
4 not even aimed at display production?
5 MR. SCHLITZER: Objection, form.
6 THE WITNESS: I'm not sure I can go that
7 far. It's an etching technique that, while I
8 don't know of a specific instance where it is
9 used, it's possible.
10 BY MR. GIBSON:
11 Q. Okay, but you're not aware of an
12 instance where this is used for display
13 production?
14 A. I'm not.
15 Q. And it doesn't state in the document
16 that it should be used for display production,
17 correct?
18 A. Well, it doesn't specifically mention
19 displays, but certainly it's talking about
20 microelectronics in general and highlights its
21 ability to increase yields and achieve tight
22 tolerances and all of this is consistent with its
23 use within display production.
24 Q. But it doesn't talk about using it in
25 display production, correct, the document itself?

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1 A. The document itself doesn't mention
2 display production or display repair.
3 Q. I seem to not have the last one,
4 Exhibit 2021 -- or I don't have that one, but
5 maybe we don't need it for the questions. Let's
6 give it a shot.
7 MR. SCHLITTER: I don't have it.
8 BY MR. GIBSON:
9 Q. If it turns out we do, then we'll --
10 A. Depends on the question.
11 Q. -- we can get it at a break.
12 I mean, Exhibit 21 you listed, it was a
13 paper from 1994, an SIJ digest of technical papers
14 and I assume that you read it, correct?
15 A. I certainly read it multiple times and I
16 recall some of it, but depending on your
17 questions, I may need it.
18 Q. Do you know anything about the company
19 Photon Dynamics?
20 A. No.
21 Q. Did you review any of the Photon
22 Dynamics' technology that was available in 1997?
23 A. Not that I can recall. I did review as
24 much as I could about anything that mentioned
25 display repair in the literature. Some of those

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1 may have been, but I don't remember if it was that
2 company in particular.
3 Q. So you're not -- as you sit here today,
4 you couldn't identify Photon Dynamic technology
5 that was available in 1997?
6 A. I cannot -- I'm not familiar with that
7 company in any great detail.
8 Q. And do you know that they were acquired
9 by another company after 1997?
10 A. No, I don't know that.
11 Q. And I take it you haven't contacted
12 Photon Dynamics or its present parent company as
13 part of your engagement here?
14 A. I have not. I have no idea who that
15 parent company is or any of this history that
16 you're mentioning.
17 Q. Okay. And for any of the exhibits that
18 are listed in paragraph 161 of your declaration,
19 which we went through several of them, did you
20 contact any of the companies as part of this
21 assignment?
22 A. I did not contact any of the companies
23 that are in this list.
24 Q. Now, if a student came to you having
25 drawn conclusions from reviewing websites, would

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1 you trust those conclusions?
2 MR. SCHLITTER: Objection, form,
3 foundation.
4 THE WITNESS: It depends.
5 BY MR. GIBSON:
6 Q. What does it depend on?
7 A. It depends on how those websites are
8 being used in the argument or the conclusion that
9 the student is making.
10 Q. Let's go back to your declaration, or
11 this paragraph 180 of this declaration. Some of
12 the two declarations for both days -- or from both
13 patents, overlap so I'm endeavoring to use the
14 paragraph numbers that correspond to today's
15 declaration. So I think if we look at page 94,
16 you also have this in your declaration from the
17 '102.
18 This is some -- some opinions you formed
19 reviewing Shiba, correct?
20 A. This is in the section where I discuss
21 Shiba. If you're going to ask me specifically
22 about 180 and following, I'll probably take a
23 minute to remind myself what's written here.
24 Q. I was actually more going to focus on
25 your -- on the -- on the drawing --

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1 A. Okay.
2 Q. -- that you've -- that you've got there.
3 And you made some other -- in your other
4 declaration, I think you made another drawing as
5 well and I'll probably show that to you as well so
6 we'll have those in front of us.
7 What exhibit number are we up to? This
8 is 1011?
9 (Document marked as Exhibit Number 1011
10 for identification.)
11 BY MR. GIBSON:
12 Q. And what is Exhibit 1011?
13 A. Exhibit 1011 is a magnified copy of my
14 modified figure on page 94 of my declaration.
15 Q. And is this the modified figure or is
16 this the figure based on Shiba?
17 A. I suppose to be clear, this is Fig. A,
18 which is a schematic view of Fig. 4 where my
19 intention is to redraw it so that the layers are
20 more clear. So in that sense, I've modified it.
21 It's not just a copy of the patent figure.
22 Q. Okay.
23 A. But it is intended to match the
24 structures and layering that is already in Fig. 4
25 of Shiba.

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1 Q. Right. You didn't -- you didn't modify
2 the layerings or the masking process or the
3 etching process. This is meant to reflect what
4 would happen if you used Fig. 4 of Shiba?
5 A. That's correct.
6 Q. I'm going to show you from page 49 of
7 your other declaration -- if we could mark this as
8 1012.
9 (Document marked as Exhibit Number 1012
10 for identification.)
11 BY MR. GIBSON:
12 Q. And what is Exhibit 1012?
13 A. Fig. -- I'm sorry, Exhibit 1012 is
14 largely the same thing but from my other
15 declaration.
16 MR. GIBSON: And let's mark this as
17 1013.
18 (Document marked as Exhibit Number 1013
19 for identification.)
20 BY MR. GIBSON:
21 Q. And what is Exhibit 1013?
22 A. Exhibit 1013 is from page 50 of my
23 declaration for the '204 patent and it is a
24 modification of my drawing in Fig. A, which is in
25 the first two exhibits we just mentioned, as a

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1 hypothetical structure to consider some of the
2 arguments in the case.
3 Q. And what led you to decide to illustrate
4 this hypothetical structure?
5 A. The arguments that we're talking about
6 in the case or the issues relate to the location
7 of the ITO and Fig. 4 of Shiba is kind of hard to
8 see. It's really quite dense. So to make those
9 -- that discussion clearer, I prepared these
10 figures so that we could see very clearly the
11 relationship between the layers.
12 So Fig. A in both declarations is meant
13 to be what Shiba explicitly discloses and Fig. B
14 is a hypothetical to talk through and to consider
15 a modification of the processing under a
16 hypothetical that Dr. Hatalis seems to be
17 suggesting is possible and obvious and I disagree
18 with him.
19 Q. And what you're doing is you're
20 modifying -- in Exhibit 1013, you're modifying
21 where the ITO layer goes?
22 A. Not quite.
23 Q. You're trying to put it over the
24 protective yellow coat?
25 A. What -- I mean, the difference between

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1 Fig. A and Fig. B is the relationship between the
2 processing step that deposits the ITO layer which
3 is labeled pixel electrode 251 in both layers, the
4 relationship between that and the other layers,
5 especially the source electrode material, but also
6 to some extent the protective overcoat.
7 And Shiba discloses that first, the ITO
8 is deposited; subsequently, the source electrode
9 metal is deposited and then finally, the
10 protective overcoat 241 is deposited. That's the
11 sequence that's disclosed in Shiba explicitly.
12 Now --
13 Q. And there's an orientation film which
14 doesn't have much bearing on your assignment?
15 A. Right. That's right. The orientation
16 film must be there in an LCD display to control
17 the liquid crystal layer and that's largely the
18 same in both.
19 So Dr. Hatalis has asserted that it
20 would be obvious and trivial to apply some known
21 principles from the prior art to create the ITO
22 layer in the terminal portion of Shiba and I
23 disagree for several reasons.
24 And this is one of the reasons -- or
25 this figure is used in one of my reasons to say

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1 no, it's not trivial and it's not obvious to a
2 person of ordinary skill in the art.
3 Q. Okay. And how have you modified the
4 steps -- when we're looking at Exhibit 1013 from
5 Exhibit 1011, how have you modified the steps?
6 A. Sure. So if we begin with Fig. A, then
7 we'll see what we compare to. So Fig. A -- I hope
8 you can see -- in the capacitor portion, there's a
9 capacitor line Cj that is then overlaid with a
10 gate dielectric material 211. And then on top of
11 that is the ITO pattern next and that forms a
12 capacitor. There's two electrodes. There's a
13 carefully controlled dielectric insulator in
14 between those two electrodes and that's -- that's
15 how Shiba discloses forming the capacitor.
16 That ITO is deposited before the pad 751
17 material and the protective overcoat. So it would
18 be not possible to keep the processing steps in
19 Shiba and the relationship among those steps and
20 simply create ITO in the terminal portion around
21 pad 51 --
22 Q. 751?
23 A. -- 751.
24 Q. One question I had and then I'll let you
25 continue is, wouldn't you have the ITO layer on

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1 pad 751?
2 A. In Fig. A, it's not, all right, because
3 that's -- that's what's shown in Shiba. There's
4 no disclosure of ITO in the terminal portion. In
5 Fig. B, I didn't apply it there simply because
6 that's not what I'm using. That's not the area of
7 this -- that I'm focusing on. My discussion is
8 about the consequence of reversing the order, as
9 Dr. Hatalis is saying, on the capacitor.
10 Q. Right. What I'm asking is, wouldn't you
11 expect there to be an ITO layer on pad 751 as one
12 of ordinary skill in the art?
13 MR. SCHLITZER: Objection, form.
14 THE WITNESS: No. That's precisely what
15 I'm trying to get at with this Fig. B. I'm saying
16 that, first of all, a person of ordinary skill in
17 the art would not do anything toward this
18 structure in Fig. B because it complicates the
19 formation of that capacitor.
20 BY MR. GIBSON:
21 Q. Well, I'm talking about just focusing on
22 Shiba in Fig. -- Fig. A, which is --
23 A. Okay.
24 Q. -- you're saying there would be no ITO
25 layer on the pad?

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1 A. So first, Shiba does not disclose any
2 ITO around or near or in any relationship with the
3 pad 751. And a person of ordinary skill
4 recognizes, in my opinion, that if in the
5 processing of the unmodified Fig. 4 of Shiba,
6 which I've reproduced in Fig. A, if the ITO was
7 simply created over there in the same step as it
8 is in the pixel electrode, then that material
9 would be underneath the pad and would not serve
10 any of the purposes of corrosion protection that
11 we are discussing in this case. So there wouldn't
12 be any point to do that. No -- none of the art
13 that we're talking about puts ITO underneath the
14 terminal metal.
15 Q. Right. I'm just saying as one of
16 ordinary skill in the art, wouldn't you expect
17 there ultimately to be an ITO layer on the pad
18 751?
19 A. Oh, I most certainly would not.
20 Q. No? Okay. All right.
21 So you're -- so in Fig. A, you've
22 reproduced what you have in Shiba and then in
23 Fig. B, you're changing the steps as you were
24 discussing, correct?
25 A. In Fig. B, I'm hypothesizing the change

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1 of the sequence of the order. So I'm changing the
2 disclosure of Shiba to consider a hypothesis that
3 Dr. Hatalis has said is trivial and obvious.
4 Q. Right. Okay. And the steps that you're
5 changing, you're still going to go ahead and put
6 your capacitor line Cj and your scanning line Yj
7 first, right?
8 A. That's correct, that's the same in both
9 figures.
10 Q. And then you're going to go and put down
11 the gate dielectric 211, correct?
12 A. That's what would happen next in my
13 modified Fig. B, which of course is not disclosed
14 in Shiba.
15 Q. Then you're going to put down the pad
16 and the source -- and the source electrode?
17 A. Well, maybe -- I think it's a bit out of
18 order. If we want to talk about the pad and the
19 source electrode, then I need to back up to make
20 it more clear.
21 Q. Go ahead.
22 A. All right. So as we already said, the
23 capacitor lines would be formed first, then the
24 gate dielectric 211 next. Now, in this structure,
25 the next step would be the source electrode metal

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1 and the pad 751. That would need to be
2 immediately after the protective overcoat.
3 Q. Right. And that's what I thought I
4 said.
5 A. I may have missed it. I apologize.
6 Q. Okay. I may have said it incorrectly,
7 but that's what I thought I said.
8 That was my understanding was the next
9 step in your modified Shiba would be you put the
10 pad down and put the source electrode down?
11 A. And then after that put the protective
12 overcoat and pattern -- pattern that.
13 Q. Right. Then you're going to create an
14 opening so that the ITO can interact with the
15 source electrode, correct?
16 A. There will need to be multiple openings
17 in the protective overcoat. Of course there needs
18 to be an opening formed over pad 751, certainly an
19 opening to connect to the source electrode 231.
20 And most importantly to this discussion, there
21 would need to be an opening over the capacitor
22 line, as I think you can see above the capacitor
23 Cj.
24 And it's that opening, that etching
25 step, that is the complicating factor for one of

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1 ordinary skill. That's a very difficult thing to
2 do.

3 Q. What are you saying is the opening on
4 the -- are you -- you're saying the opening on
5 protective overcoat 241 that's right above the
6 gate dielectric 211?

7 A. Yes, that's the opening that I'm
8 referring to as being difficult and not trivial
9 and not obvious and quite a complication for
10 manufacturing.

11 Q. And that's what you consider to be wrong
12 with what Dr. Hatalis has suggested?

13 A. Dr. Hatalis has suggested that it's
14 trivial and obvious to make the change that I've
15 pictured here and I disagree. It is not obvious
16 first because Shiba doesn't disclose it, but in
17 addition, it creates a complication in the
18 fabrication of that capacitor which really does
19 require precision etching.

20 And for the other areas of that
21 protective overcoat 41, the openings in the other
22 regions, there needs to be really full etching
23 into that. You can't under-etch protective
24 overcoat 241 and balancing all of that is much
25 harder than the real disclosure that's in Shiba.

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1 Q. And did you consider other
2 modifications?

3 A. At least one other modification that I
4 considered was the process where we take the
5 disclosure of Shiba and simply add an additional
6 manufacturing step to apply the ITO after the
7 protective overcoat 40 -- 241 and the pad is
8 already formed.

9 So this would be somewhere very late in
10 the process and that's another possibility, but
11 that is explicitly against the teaching of Shiba
12 which wants to increase or it wants to not
13 increase manufacturing steps.

14 Q. Okay. Did you consider any other
15 modifications?

16 A. If I didn't write about it, then I did
17 not consider it, to the best of my memory at the
18 moment.

19 MR. GIBSON: Let's mark this as 1014.
20 (Document marked as Exhibit Number 1014
21 for identification.)
22 BY MR. GIBSON:

23 Q. And I'll submit to you 1014 is another
24 modification of Shiba and in this modification,
25 you still put down the capacitor and scanning

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1 lines first.

2 Do you see that?

3 A. I do.

4 Q. And then you next put down the gate
5 dielectric which is the same as your modification,
6 correct?

7 A. Yes, that's unchanged in any of these.

8 Q. In both. And what's different in this
9 one is the pad 751 and the source electrode is now
10 being extended over the capacitor line.

11 Do you see that?

12 A. I do.

13 Q. And that would still be one step,
14 correct?

15 A. That would be -- applying the source
16 electrode would still be one step.

17 Q. And then the next step is to apply the
18 protective overcoat, correct?

19 A. I see that.

20 Q. And then the next step is to deposit
21 the -- or next step is then to do some etching to
22 create some openings, correct?

23 A. Well, after the deposition or growth of
24 the protective overcoat insulator 241, there would
25 need to be an etching step to create openings so

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1 that you can contact the pad 751 and the source
2 electrode.

3 Q. And you see that has been done in this
4 modification?

5 A. I do.

6 Q. And that's also a step that you include
7 in your modification, is that correct?

8 A. Well, creating openings in the
9 protective overcoat is in all of these.

10 Q. Yeah. And then the next step is to
11 deposit the ITO layer.

12 Do you see that?

13 A. I see that as -- as drawn, yeah.

14 Q. And then the final step is to deposit
15 the orientation film.

16 Do you see that?

17 A. I do.

18 Q. All right. Would you agree that in this
19 modification, there is no damage to the dielectric
20 as the layer is going to be protected by the metal
21 of the source electrode?

22 A. Well, in this hypothetical, they're --
23 quite apart from whether there's damage to that
24 gate dielectric, this is now a double capacitor.
25 It's a totally different design for the capacitor.

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1 You've got an electrode in the capacitor line
2 that's labeled Cj and then you've got a
3 dielectric. And then you've got what's
4 illustrated here as the metal of the source
5 electrode. And then on top of that you have
6 another insulator and then on top of that, you
7 have another conductor, the pixel electrode. So
8 that's -- that whole thing forms a capacitor. One
9 of ordinary skill would not look at this and say,
10 oh, that's an obvious trivial modification from
11 the disclosure in Shiba.
12 Q. Why not?
13 A. It's totally redesigned, not only the
14 processing steps and their sequence, but it's
15 created a totally different or new capacitor line
16 and very nonstandard, by the way.
17 Q. It's the -- it's the same number of
18 steps as the original Shiba design, correct?
19 A. In as -- to the extent that I understand
20 your description of it, it seems to be the same
21 number of steps but in a different order. And
22 more importantly, it arrives at a structure that's
23 -- that has a capacitor region that's very
24 meaningfully different than what is disclosed in
25 Shiba. And it's not trivial or obvious to one of

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1 ordinary skill to -- to get to here from Shiba.
2 Q. So let me just break this down.
3 You would agree that it's the same
4 number of steps, just a different order?
5 A. I agree with that.
6 Q. Would you also agree that there's not
7 going to be damage to the gate dielectric because
8 there's -- the metal covering is going to protect
9 it when the etching's done?
10 A. Well, the reason that changing the gate
11 dielectric thickness is a problem is because the
12 capacitance of that capacitor can be
13 uncontrollable or different than it would be in
14 the disclosure of Shiba. And this suggested
15 structure also changes capacitance but for a
16 different reason, right. It adds another set of
17 electrodes and an insulator on the other side.
18 And so it's -- it's very dramatically
19 and possibly even more dramatically changing that
20 capacitance. It's a very significant design
21 change.
22 Q. Okay. Let's just start with my
23 question.
24 Would you agree that the gate dielectric
25 in this modification that we're looking at is

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1 going to be protected by the metal layer from the
2 etching?
3 A. The gate dielectric will be protected by
4 that source electrode 231 during the etching of
5 protective overcoat 241, but there still will be a
6 change to the capacitance of that capacitor.
7 Q. I'm not focusing on the change to the
8 capacitor.
9 What I'm focusing on, you said in the
10 way Dr. Hatalis had proposed to modify Shiba,
11 there would be a problem in damaging the gate
12 dielectric and this modification solves that
13 problem, correct?
14 A. I can't agree with that all the way
15 because the reason it's a problem to damage the
16 gate dielectric is because it changes the
17 capacitance of the -- of this structure and the
18 pixel.
19 And so the structure you're suggesting
20 here may not -- may not have the risk of damage to
21 the gate dielectric, but it creates another very
22 serious change to the design and the capacitance.
23 So it leads to the same eventual problem.
24 Q. Well, but it doesn't -- what I'm just
25 trying to get at is, there's not going to be

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1 damage to the gate dielectric in this modification
2 that's in Exhibit 1014?
3 A. I've already said that the source
4 electrode is going to be above the capacitor and
5 the gate dielectric during the etching step of the
6 241 layer but, again, there are other layers there
7 that you've added and changed because of the
8 sequence change that will lead to a serious
9 difference to the capacitor.
10 Q. Now, I take it you agree that it is
11 possible to reverse the order or to change the
12 order of the steps so that you can have the ITO
13 layer above the protective overcoat?
14 A. I agree it is possible to change the
15 order, but I don't think it is trivial or obvious
16 for a person of ordinary skill to begin with the
17 disclosure in Shiba and reach to this structure.
18 Q. Would you agree that changing the ITO
19 layer -- the order of the depositing of the ITO
20 layer allows you to get the ITO layer also on pad
21 751?
22 A. Well, you're offering a hypothetical
23 where you've drawn it that way and you've achieved
24 the placement of the ITO above pad 751. And I
25 disagree that this is something that a person of

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1 ordinary skill would consider based on the
2 disclosure of Shiba.
3 Q. All right. In the modification that you
4 suggested, you could also have put the -- if you
5 look at Exhibit 1013, you could put the ITO layer
6 on pad 751, correct?
7 A. It would in that case -- I didn't draw
8 it because I was focused on the capacitor portion,
9 but if it were applied, the only place it could be
10 would be above pad 751 but below the dielectric
11 insulator called the protective overcoat 241.
12 Q. In your modification, it would be below?
13 A. I'm sorry. Yeah, I stand corrected.
14 I'm sorry.
15 In my modification, it would also be
16 above, similar to your drawing. Yes. So let me
17 correct myself.
18 Q. And in your modification, wouldn't it be
19 more appropriate to show the ITO layer on pad 751?
20 I know that's not what you were focused on, but
21 shouldn't you show it there?
22 A. I didn't need to show it. That's not
23 the part I was talking about.
24 Q. But isn't it going to be sitting on pad
25 751?

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1 A. I still don't think one of ordinary
2 skill, based on the disclosure in Shiba, would be
3 inclined to put ITO on the pad.
4 Q. But you agree that it's possible to do
5 it?
6 A. I agree that your hypothetical makes it
7 possible. I think your hypothetical is just not
8 reasonable. It's not obvious, it's not trivial to
9 a person of ordinary skill.
10 Q. And in your modified Fig. 4, it would
11 also be possible to put the ITO layer on the pad,
12 correct?
13 A. It would be possible. I did not draw
14 it, but I also don't think my modified Fig. 4 is
15 -- is an option that one of ordinary skill would
16 take based on the disclosure in Shiba.
17 Q. But you could do it without adding
18 manufacturing steps?
19 MR. SCHLITTER: Objection, form.
20 THE WITNESS: In my modification, there
21 may not be additional manufacturing steps per se,
22 but there's an increased sensitivity that will
23 likely degrade yield or maybe make it even
24 impossible to make that etch reliably over the
25 whole display surface.

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1 BY MR. GIBSON:
2 Q. Okay. And in Exhibit 1014, you agree
3 there's no increase in the manufacturing steps?
4 A. 1013?
5 Q. 1014. 1013 is yours. 1014 is the
6 modified one that I've handed you.
7 A. I agree that there's no increase in the
8 number of manufacturing steps, but it does lead to
9 a capacitor that's going to behave very
10 differently. It's a very different design than
11 what's disclosed in Shiba.
12 Q. And do you know how it would behave
13 differently, the capacitor?
14 A. Well, this structure would -- would
15 essentially be two capacitors in a series and
16 there's a well-known expression from which you
17 could calculate the difference in the change in
18 that capacitance. It would likely be a dramatic
19 change and the consequence of that would be that
20 the switching speed or the time it takes to charge
21 the pixel when the display is being addressed and
22 being given its data signal, all of that changes
23 very dramatically.
24 Q. And how do you know that? Is it just
25 based on there being two capacitors now as you

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1 said?
2 A. Specifically how do I know what?
3 Q. What you just said.
4 A. Well, basic electronics and basic
5 electrical engineering supports the first part of
6 what I said, that these are essentially capacitors
7 in series.
8 Beyond that, I know from my experience
9 in LCDs that this capacitor has quite a lot to do
10 with the time -- the behavior and time of the LCD
11 pixel, not only as it's being charged, but also
12 its ability to hold that charge while the other
13 rows in the display are being addressed.
14 Q. And why do you say that the -- creating
15 the source electrode over the gate dielectric that
16 is over the capacitor line creates a second
17 capacitor?
18 A. Because a single capacitor has two
19 conductors and an insulator separating them and in
20 this case, there's three conductors with two
21 insulating films separating them.
22 So the stack of this double capacitor
23 would begin at the bottom with capacitor line Cj,
24 then go through the gate dielectric 211 and then
25 go to the source electrode material 231, and then

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1 go through the second insulator 241 and then
 2 finally arrive at the pixel electrode 251 as the
 3 last electrode.
 4 Q. So when you look at the -- just Shiba,
 5 as you drew it, are you saying that there's two
 6 capacitors there as well?
 7 A. Certainly not in any of my figures of
 8 Shiba or in the disclosure of Shiba. There's no
 9 exotic double capacitor design in Shiba.
 10 Q. Why are you saying that the pixel
 11 electrode forms a third capacitor in the modified
 12 figure in Exhibit 1014?
 13 A. I'm recognizing that it's true from your
 14 illustration.
 15 Q. Why?
 16 A. Again, because there's three electrodes
 17 that are in a stack with two insulating films in
 18 between.
 19 Q. Anything else?
 20 A. It's -- no, it's just what you've shown.
 21 Q. In terms of the word "through" that's
 22 used in both the '413 and the '204 patents, is
 23 that correct?
 24 MR. SCHLITTER: Objection, form.
 25 THE WITNESS: In the '413 patent, the

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1 word "through" is used in a phrase that involves
 2 contact through an opening and I think it's that
 3 phrase that should be examined more than just the
 4 word "through."
 5 BY MR. GIBSON:
 6 Q. And you disagree with the Board's
 7 interpretation of that word, I take it?
 8 A. I disagree with the second definition
 9 that the Board has offered in the decision. I
 10 agree wholeheartedly with the first definition.
 11 Q. If we look at Claim 1 of the '413 --
 12 A. I've got it.
 13 Q. -- there are a number of different
 14 instances of the word "through," correct, in that
 15 claim?
 16 A. There are at least three uses of the
 17 phrase "contact through an opening." I think it's
 18 in the last three elements of the Claim 1.
 19 Q. Well, it's not always contact through an
 20 opening, right? The word "through" also appears
 21 in to be "contact through the transparent
 22 conductive layer," for example, if you look at --
 23 A. Yes.
 24 Q. -- line 63.
 25 A. 163?

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1 Q. 63, line 63.
 2 A. Oh. Yes, I'm sorry. You're right. So
 3 there's one use of contact through the transparent
 4 conductor and then two uses of contact through an
 5 opening.
 6 Q. And if you look at Fig. 4A -- which I'm
 7 sure you've seen many times.
 8 A. Yes, I have.
 9 Q. If you want to look at it in the
 10 declaration or you can look at it in the patent.
 11 A. No, I have this claim chart in the
 12 declaration that's helpful in identifying the
 13 elements of the claim, so I'm preparing for a
 14 discussion on that.
 15 Q. When you look at Fig. 4A, we're only
 16 seeing sort of half of the opening where the ITO
 17 is connecting in the -- in between the resin
 18 interlayer film?
 19 A. Is that a question?
 20 Q. Yes.
 21 A. I'm not sure that's -- I'm not sure I
 22 know what you mean by "half the opening."
 23 Q. Well, if you were to draw to the right
 24 of what's occurring, which we don't see in
 25 Fig. 4A, you would have more ITO layer than the

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1 ITO would go above the insulating layer film, the
 2 resin?
 3 A. I think the '413 patent is silent on
 4 what's to the right.
 5 Q. And you as -- you don't think a person
 6 of ordinary skill in the art would understand that
 7 to the right there's going to be a place where the
 8 ITO stops and the insulating layer begins again?
 9 A. Not necessarily. It's one of the
 10 options certainly, but it's not -- not disclosed
 11 and it's not required either. The rest of the
 12 region to the right could simply a continuation of
 13 the very same pattern without the return of the
 14 element 113.
 15 Q. Well, where is the -- where is the
 16 opening where the ITO -- in Fig. 4A, where is the
 17 opening that connects 4A -- or that in 4A connects
 18 114 to the external connection lines 403?
 19 A. The opening is where the element 113 is
 20 missing in this figure, regardless of what's going
 21 on on the right side of the not illustrated part
 22 of this figure.
 23 Q. So 113, the resin, could just end and
 24 you would consider that to be an opening?
 25 A. The resin is an insulator that would be

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1 applied similar to one of the insulators that
2 we've already talked about today and it's
3 deposited on the whole -- the whole substrate and
4 then needs to be patterned and opened so that
5 there would be ability to contact through that
6 opening to the conductive layers below.
7 Q. But we don't know what's going on
8 after -- after this figure ends on the right, you
9 don't know what's happening? There's many
10 possibilities?
11 A. There are many possibilities and I think
12 the two we identified is where this cross-section
13 on the right side in the first region continues to
14 the right.
15 And the other possibility, as you've
16 suggested, is that at some point to the right,
17 there's a return on the other side of the opening
18 with -- where there's a return of the second
19 insulator 113. Both are possible.
20 Q. All right. And you would find -- as one
21 of ordinary skill in the art, you would think that
22 one of ordinary skill in the art would find that
23 both are possible?
24 A. A person of ordinary skill would find
25 both possible and both would be consistent with

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1 the claim language of contact through an opening.
2 Q. In the example that I gave where you
3 essentially have the mirror image of 4A to the
4 right, and you have an opening that's formed by
5 cutting out the resin -- are you with me?
6 A. I am, yes.
7 Q. And you see that the -- the resin has a
8 vertical wall, correct, where it ends?
9 A. There's a vertical wall that's
10 illustrated for the resin, certainly.
11 Q. Is there any reason that this would not
12 be a vertical wall that you can think of? Does
13 the patent teach that it wouldn't be a vertical
14 wall?
15 A. The patent doesn't -- is silent on how
16 -- how vertical or sharp these lines are. You
17 know, a person of ordinary skill would know that
18 the precision of that wall shape and potential
19 tilt angle really depends on how closely you look.
20 Q. But it certainly could be vertical?
21 A. It could be at least approximately
22 vertical.
23 Q. And in one of the preferred embodiments,
24 in Fig. 4A, it is vertical?
25 A. That's what's shown. That's what

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1 Fig. 4A shows.
2 Q. Does the '413 patent disclose any
3 problems with the failure of the bonding of the
4 sealant to the substrate?
5 A. I believe it does. You might be able to
6 direct me there to save us time.
7 Q. All right. I'm not aware of it doing
8 that.
9 A. Well, let me -- let me look. Okay.
10 Thank you for the moment to refresh my memory.
11 It's clear from the specification that a resin
12 inter-layer film is always disclosed as being
13 above the wiring below the sealant in the
14 specification and that's required in Claim 1, but
15 there's no -- there doesn't seem to be any
16 explicit discussion as to why that's important in
17 the spec.
18 Q. And there's no discussion saying that
19 that was a problem in the prior art, that somehow
20 there's a problem with the sealant in the prior
21 art and it's not bonding with the substrate
22 because of some other structure?
23 A. Well, there does not seem to be an
24 explicit disclosure of those kind of problems, but
25 Column 3 around lines 23 to 26 say -- or disclose

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1 the ordering of placing an inter-layer film made
2 of a resin material on the wiring.
3 Q. Those are focused on height
4 differentiation, right?
5 A. What do you mean by "those"?
6 Q. The object of the invention as described
7 there is to reduce a height difference, not to
8 increase bonding because there's been some problem
9 in the prior art with bonding.
10 A. In this section, that's -- that's the
11 sentence before the part that I just referred to.
12 Q. Even in the next sentence, it talks
13 about it is another object of the present
14 invention to reduce the height difference under
15 the sealant region.
16 A. That's what it says, yeah.
17 Q. Again, it doesn't talk about there being
18 a problem with the bonding in prior art or in the
19 prior art, correct?
20 A. The specification of the '413 does not
21 discuss a problem in the prior art. One of
22 ordinary skill would know that there's a big
23 difference in bonding to ITO and the resin
24 inter-layer film material, but it's not disclosed
25 here.

| | |
|---|--|
| <p style="text-align: right;">Page 158</p> <p>1 Q. Right. But that's -- that's known -- I 2 mean, that's been known for a long time, before 3 1997 that it was a problem to try to bond to an 4 ITO layer, right? 5 A. I think it is a principle that a person 6 of ordinary skill would have known by 1997, that 7 that was a situation to try to avoid. 8 Q. All right. So you would agree then that 9 a person of ordinary skill in the art in 1997 10 would know that you would not want to have the ITO 11 layer as your uppermost layer that would interact 12 with a sealant? 13 A. I wouldn't characterize it that way. 14 It's my opinion that a person of ordinary skill 15 would -- would know that the adhesion between a 16 sealant and an ITO layer would be less strong and 17 have a shorter lifetime than one formed with a 18 resin inter-layer film or an insulator. But 19 still, a person of ordinary skill might still 20 choose to make that bond anyway, perhaps because 21 of cost reasons or a particular design in mind. 22 Q. But you would agree that they would also 23 know that there would be issues with the bonding 24 if they had the ITO layer on top, so if you -- all 25 things being equal, you would rather not have the</p> | <p style="text-align: right;">Page 160</p> <p>1 often in projectors. 2 Q. So you would agree though that in terms 3 of bonding, it would be advantageous to have the 4 ITO layer not be the layer directly below the 5 sealant to one of ordinary skill in the art in 6 1997? 7 A. I think one of ordinary skill would see 8 that as -- would have known that that would make a 9 better seal and depending on the other 10 constraints, that may be the choice that they 11 would take advantage of. 12 Q. When you say "the choice," what do you 13 mean by "the choice"? 14 A. It's a design choice that's made, right, 15 the sequence of layers, the presence of ITO there 16 or not or whether there's an opening there or not 17 or the insulator or not on both substrates as 18 well. All those are things that have to be 19 chosen. 20 Q. Right. Well, I'm just -- the way you 21 answered the question, I want to make sure we're 22 on the same page. 23 You agree that one of ordinary skill in 24 the art in 1997 would understand in terms of 25 bonding, you would rather be bonding to an</p> |
| <p style="text-align: right;">Page 159</p> <p>1 ITO layer on top touching the sealants or bonding 2 with the sealant? 3 A. All things are rarely equal when there's 4 so many dimensions of tradeoffs and I think it's 5 not clear what one of ordinary skill would do. 6 And I certainly am aware of situations where the 7 ITO was the upper layer and it was nevertheless 8 still formed in that way. 9 Q. In what situations are you aware of 10 that? 11 A. Especially in the prototypes that I've 12 seen in my career. 13 Q. After 1997? 14 A. That would be after 1997. 15 Q. Have you seen any finished products 16 since 1997 where the ITO layer was the layer that 17 was bonding with the sealant? 18 A. I've seen it in some LCD systems in 19 finished products. 20 Q. What ones? 21 A. I can't tell you their names or vendors. 22 Quite often it's in the -- the ones I can 23 remember, the kind of displays I can remember are 24 those that are small that are near-to-eye displays 25 or sometimes are called microdisplays. They're</p> | <p style="text-align: right;">Page 161</p> <p>1 insulating layer rather than the ITO layer? 2 A. If nothing else mattered, then bonding 3 to an insulating film with a sealant would be 4 better than bonding to the ITO and I do think that 5 a person of ordinary skill at the time would have 6 known that. 7 Q. Are you aware of any prior art or any 8 statement in the '413 describing a problem with 9 the prior art because the ITO overlaps where the 10 -- and touches the sealant? 11 A. The '413 specification and claims are 12 silent on that. 13 Q. Any of the prior art references that 14 we've discussed today, do they show the sealant in 15 direct contact with the ITO? 16 A. Nakamoto shows it. 17 Q. Which figure in Nakamoto? 18 A. Fig. 9 in Nakamoto is one example. 19 Q. And what part of Fig. 9 are you 20 referring to? 21 A. Well, at the base of the sealant that's 22 illustrated there, the part that we've already 23 talked about is the right side where the PSV layer 24 is coming in from the right side and partially 25 entering the sealant and then -- but to the left</p> |

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1 side of the sealant, it's touching whatever is
2 below that.
3 To be honest, I can't tell, now that I'm
4 looking at it, what that layer is. I thought it
5 was ITO, but now upon inspecting it, it may
6 actually not be.
7 Q. Okay. Any other --
8 A. I'd have to examine Shiba to make sure
9 Shiba doesn't show that. I don't recall that it
10 does.
11 Q. If you look at -- I think we had before
12 Exhibit -- I think it's 2010. That's the Sukegawa
13 Fig. 2C that was drawn on by Professor Hatalis.
14 Yes, that's it.
15 A. I've got it.
16 Q. Would you agree that in that figure,
17 assuming the sealant is where Professor Hatalis
18 drew it, that it is not touching the ITO layer?
19 A. Well, of course I disagree with the
20 placement of the sealant there, but despite that,
21 it's not illustrated by Dr. Hatalis as touching
22 the ITO.
23 Q. It's not?
24 A. It is not.
25 Q. Is there any problem with the ITO layer

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1 running under the insulating film that's touching
2 the sealant?
3 A. I'm not sure what you mean by is there a
4 problem.
5 Q. Do you have any issue with the ITO layer
6 running under the insulating -- running under an
7 insulating film that's touching a sealant? Do you
8 think that would cause any issues?
9 A. Well, if we listen to the disclosure in
10 Sukegawa, the ITO is present there as one of the
11 double protection layers against corrosion. The
12 insulating film above it is the second one. I
13 don't disagree with Sukegawa on that.
14 Q. So I'm not sure, is there -- is there a
15 problem or not with having the ITO layer run
16 underneath the insulating layer that's bonding to
17 the sealant?
18 A. In this discussion, the primary problem
19 is that it's not disclosed in Sukegawa. That's
20 expressly what's not disclosed. The sealant is
21 not shown here. Wherever the sealant is, it's not
22 here in Sukegawa. If you want me to speculate
23 about additional problems that could happen --
24 Q. I don't want you to speculate. I just
25 want to know -- I don't want you to speculate. I

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1 just want to know if you have a view if there is
2 an additional problem. I'm not asking for
3 speculation.
4 A. I can't think of an additional problem
5 with having ITO underneath the insulating layer 9.
6 MR. GIBSON: Why don't we go ahead and
7 change the tape?
8 MR. SCHLITTER: Should we take a break
9 then?
10 VIDEOGRAPHER: We're going off record.
11 This is the end of Media Unit Number 3. The time
12 is the 3:05.
13 (Short recess.)
14 VIDEOGRAPHER: We're back on record.
15 This is the beginning of Media Unit Number 4 in
16 the deposition of Dr. Michael Escuti. The time is
17 3:21. Please continue.
18 BY MR. GIBSON:
19 Q. If you'd turn to your declaration,
20 page 23.
21 A. I've got it.
22 Q. And you've put a copy of Fig. 4A into
23 that and then you've drawn a dotted line and
24 designated a first and a second region?
25 A. That's what's shown. In fact, this is a

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1 figure that I think I'd like to adopt another
2 figure in place of from the decision on page 13,
3 because my modification here identifying the
4 regions is imprecise and not helpful in its
5 imprecision.
6 Q. Why do you say it's imprecise?
7 A. Well, the reason I created this modified
8 figure was to emphasize how the -- these regions
9 are spoken of in the claim as having items that
10 are above -- or I should say over the regions of
11 the second wiring. And that's why I was creating
12 it, but I didn't precisely draw those arrows to
13 indicate what I think is the first and second
14 region precisely. So it's misleading. So
15 instead, it's the decision page 13 has the figure
16 that I would like to adopt fully in place of this
17 figure.
18 Q. So when you look at Claim 1 of the
19 '413 --
20 A. Got it.
21 Q. -- in terms of the prior art, you would
22 agree we're talking about liquid crystal display
23 devices? No dispute there?
24 A. No dispute there.
25 Q. The prior art has a first wiring over a

Page 166

1 substrate?

2 A. Prior art does have a first wiring over

3 a substrate.

4 Q. Prior art also has a first insulating

5 film over the first wiring?

6 A. In some cases, yes.

7 Q. Like Sukegawa has that, for example?

8 A. For example, Sukegawa.

9 Q. And there's also a second wiring over

10 the substrate and the first insulating film,

11 Sukegawa has that?

12 A. Sukegawa also has the second wiring over

13 the substrate and the first insulating film.

14 Q. And it also has a second insulating

15 film?

16 A. Sukegawa does have a second insulating

17 film over the second wiring, but I should note

18 that it's -- it's not over the second wiring in

19 combination with the other limitations of the rest

20 of this Claim 1.

21 Q. I'm just going down the -- down the

22 order. It does have a second insulating film over

23 the second wiring?

24 A. To this point, yes, but to the extent

25 that any of the other limitations affect what

Page 167

1 qualifies as that second insulating film, I can't

2 agree.

3 But at least to this point, yes, it has

4 another insulating film, which until this point we

5 can identify as being over the second wiring.

6 Q. And a transparent conductive layer, you

7 understand that to be an ITO?

8 A. I would not take that to be equivalent

9 to ITO. ITO is an example of a transparent

10 conductor. It's a very common choice for that,

11 but it's not exclusively the choice that must be

12 made.

13 Q. Fair enough. The transparent conductive

14 layer, you have that in Sukegawa over a first

15 region of the second wiring?

16 A. Well, there is a transparent conductor

17 over a second wiring in Sukegawa, but I don't

18 agree that it is in a first region in the way the

19 rest of the claim talks about.

20 Q. Would you agree that there is --

21 somewhere in Sukegawa you're going to have sealant

22 that is in direct contact with the second

23 insulating film?

24 A. I understand Sukegawa to mention that

25 sealant is holding the substrates together or

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1 it's present. Sukegawa does not disclose the

2 location or position of the sealant at all, but I

3 do think one of ordinary skill would identify it

4 as between the two substrates.

5 Q. And because Sukegawa says there's an

6 insulating film as the outermost layer on the

7 substrate, you would expect the sealant to be in

8 contact with that outermost layer?

9 A. If I -- if I look at the example that's

10 illustrated in Fig. 3 or the series of Figs. 3, I

11 think that's consistent with -- that's one example

12 where that's the case, where the sealant is in

13 contact with that upper insulating film.

14 Q. And you would agree that the second

15 wiring overlaps at least part of the first wiring

16 in Sukegawa?

17 A. Do I agree --

18 Q. That the first and second wiring overlap

19 at least in part?

20 A. I do agree that the first and second

21 wirings in Sukegawa overlap at least in part.

22 Q. And if you look at Sukegawa, Fig. 2C,

23 the first wiring would be element 2?

24 A. The first wiring, Sukegawa doesn't call

25 it simply that. He's got other names, but that

Page 169

1 might be a first wiring if we were to try to apply

2 the language from Claim 1 in the '413 patent.

3 Q. You think a person of ordinary skill in

4 the art would understand that, to be equivalent to

5 a first wiring?

6 A. For the first wiring, I think so.

7 Q. And then element 3, would you understand

8 that to be an insulating layer?

9 A. Element 3 is called an inter-layer

10 insulating film in Sukegawa, and so clearly it's

11 an insulator, and it is the first one that appears

12 over the first wiring.

13 Q. And you would consider those -- the

14 second wiring and first wiring to be in contact

15 through the opening in insulating film 3?

16 A. In Sukegawa, the upper metal layer

17 wiring 7 is in contact with the first or lower

18 metal layer wiring 2 through the openings in the

19 insulating layer 3.

20 Q. And those are vertical openings as

21 depicted there?

22 A. They're depicted as vertical openings,

23 or to be more precise, they're openings that have

24 vertical side walls.

25 Q. As of 1997, you would agree that it was

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1 standard practice for one of ordinary skill in the
2 art to avoid sealing LCDs in a way that the
3 sealant was in contact with a conductor such as an
4 ITO in the terminal region and instead have the
5 sealant be in contact with another material --
6 MR. SCHLITTER: Objection, form.
7 BY MR. GIBSON:
8 Q. -- such as an insulating resin?
9 A. Well, we discussed that before the
10 break, right. It's a principle that would have
11 been known to a person of ordinary skill that the
12 adhesion in the two cases would be different. One
13 is preferable, but not required.
14 Q. Would you agree that it would be
15 standard practice to avoid sealing LCDs in a way
16 that the sealant was in contact with the ITO
17 layer?
18 A. I don't think I can characterize a
19 standard practice. I think both were options to a
20 person of ordinary skill.
21 Q. And if you'd look at your declaration on
22 page 25, if you look at the third line, the
23 sentence that begins, "It is therefore standard
24 practice for one of ordinary skill in the art to
25 avoid sealing LCDs in such a way that the sealant

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1 is in contact with a conductor (e.g., ITO) in the
2 terminal region with another material (e.g.,
3 insulating resin) elsewhere."
4 Do you see that?
5 A. I do. That's what it says.
6 Q. Do you stand by those words?
7 A. Yeah, I do.
8 Q. Would you agree that it's inappropriate
9 to limit claims to the embodiments in the
10 specification?
11 A. I agree that it's inappropriate to do in
12 patents.
13 Q. So if you had to -- you would understand
14 that -- we've gone over this -- in Sukegawa, you
15 would have sealant and that it would be preferable
16 to have it be near the edge of the counter
17 substrate, but with some offset from the counter
18 substrate?
19 MR. SCHLITTER: Objection, form.
20 THE WITNESS: Could you rephrase the
21 question or restate it?
22 BY MR. GIBSON:
23 Q. Yeah, let me -- let me break it into
24 two pieces. We've covered some of this before.
25 But in 1997, a person of ordinary skill

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1 in the art looking at Sukegawa would understand
2 there would be sealant present?
3 A. Yes.
4 Q. And they would also understand that the
5 sealant is ordinarily near the edge of the counter
6 substrate but with some offset from the counter
7 substrate edge?
8 MR. SCHLITTER: Objection, form.
9 THE WITNESS: I'll note that the terms
10 of "some offset" and the term "near" it's not
11 defined in this conversation, but to the extent
12 that there's normal meaning applied to those, then
13 that's where sealant is placed in general, offset
14 from the edge of the counter substrate as we
15 looked at in Nakamoto as one example.
16 BY MR. GIBSON:
17 Q. So in Fig. 2C, where would one -- where
18 would one of ordinary skill in the art put the
19 sealant?
20 A. Well, Sukegawa, wherever it is, it's not
21 in any of these terminal figures, including 2C.
22 The only place it might be found would be in
23 Fig. 3D because Fig. 3D includes the counter
24 substrate as element 200.
25 So wherever Sukegawa would put it or

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1 that a person of ordinary skill would understand
2 it should be would be to the left side of Fig. 3D
3 between the two substrates.
4 Q. And there would be -- would you agree
5 that there would be sealant between 100 and 200 in
6 Fig. 3D?
7 A. I do agree that the sealant would be in
8 between there and, of course, that whole region is
9 off the illustrations of cross-sections in
10 Figs. 2C, 3B, 3E, for example.
11 Q. And do you know how far off it is?
12 A. It's not illustrated, but it's certainly
13 not right at the edge.
14 Q. How do you know it's not right at the
15 edge?
16 A. Well, it's not -- it's not clear, I
17 guess I should say.
18 Q. You mention in your declaration that the
19 '413 patent discloses that the sealant will
20 include spacers in it.
21 A. The sealants, as disclosed in the '413
22 patent, is spoken of as having spacers, at least
23 one example of that. It's not required.
24 Q. All right. But you use that as an
25 example as to why there would be unevenness if you

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1 were to put the sealant in a counter substrate
2 where Professor Hatalis did in 2C, correct?
3 A. That's -- that's one negative
4 consequence of doing what Dr. Hatalis suggests.
5 There are others that I think are more -- actually
6 more important, but that's an additional one.
7 Q. But you would agree that sealant doesn't
8 have to have spacers in it?
9 A. I would agree that some sealants don't
10 have spacers in them.
11 Q. And the '413 patent doesn't limit itself
12 to sealant with spacers in it, it's not a
13 restriction of the claims?
14 A. It's not a restriction of the claims,
15 but I -- certainly not of Claim 1.
16 Q. And you're not trying to read in that
17 restriction into your interpretation of Claim 1,
18 correct?
19 A. I'm not trying to read that as a
20 requirement to Claim 1. It is a practice that a
21 person of ordinary skill would commonly do,
22 especially in 1997, but it's -- it's not required.
23 Q. All right. And it would be reasonable
24 not to do it, right, not to use sealant with
25 spacers, correct?

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1 A. It would depend.
2 Q. It would depend on what they were trying
3 to achieve, but in certain situations, it would be
4 reasonable to have sealant that didn't have
5 spacers, correct?
6 A. By 1997, I am aware of techniques that
7 would provide alternate means to achieve the
8 spacing between the substrates that would not
9 include necessarily a spacer that's in the
10 sealant, but it still would be, by that point, I
11 think, a fairly standard practice to use.
12 Q. But it wouldn't be unreasonable to use
13 sealant without spacers, correct?
14 A. It would depend on the situation on
15 whether or not it was reasonable, but it wouldn't
16 be required.
17 Q. I just want to make sure, through your
18 declaration, you're not trying to imply that the
19 '413 patent requires the use of sealant with
20 spacers?
21 A. Well, the claims do not require a
22 sealant with spacers in it. I may need to refresh
23 my memory on the specification and how it
24 describes, but in any case, it would -- it would
25 be an example of a sealant in the specification.

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1 Q. Right. But in interpreting the claims,
2 you wouldn't limit the sealant to the example in
3 the specification, would you?
4 A. I would not.
5 (Document marked as Exhibit Number 1015
6 for identification.)
7 BY MR. GIBSON:
8 Q. Exhibit 1015 is the '102 patent and I
9 take it from your testimony earlier today, you've
10 never seen that patent before?
11 A. I don't recall ever seeing this patent.
12 Q. So in doing your assignment for either
13 the '413 patent or the '204 patent, you didn't go
14 and look at other prior art that was -- that was
15 around 1997 or earlier to determine the overall
16 state of the art?
17 A. I did some searching, certainly
18 informally, but whatever I found didn't amount to
19 much that was used to form my opinions.
20 Q. And you don't recall any of that art?
21 A. I don't.
22 Q. Did you keep it anywhere?
23 A. No.
24 Q. What kind of searching did you do?
25 A. Google patent kind of searching.

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1 Q. What did you do specifically in terms of
2 Google patent searching?
3 A. I don't recall specifically, but
4 searching keywords that would be relevant to the
5 case and see what came up and then search the
6 results to see if there's anything that's relevant
7 or important to the -- to the case or to forming
8 my opinions.
9 Q. How much time did you spend on it?
10 A. Not much time.
11 Q. Can you give me a number of hours?
12 A. Single digit hours.
13 Q. So something like three to five?
14 MR. SCHLITTER: Objection.
15 THE WITNESS: I just don't recall.
16 BY MR. GIBSON:
17 Q. How much time overall have you spent on
18 this matter?
19 A. I haven't looked lately, but it's --
20 last time I looked it was 130 hours.
21 Q. And prior to submitting your declaration
22 or right after you'd submitted your declaration,
23 how much time had you spent?
24 A. Right after I submitted --
25 Q. Right.

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1 A. By the time I submitted my declaration?
2 Q. Yes.
3 A. I think that's the number I gave you,
4 100 and -- more than 130. I haven't looked since
5 then.
6 Q. If you could look at the '102 patent and
7 look at just Figs. 5A, 5B, 5C, 5D.
8 A. I'll do my best but, of course I've
9 never seen this, so I'm not sure what I can say
10 about a reference I've never seen.
11 Q. And you may not be able to and that's --
12 that's fine.
13 I'm just going to ask you, do you
14 recognize the steps that are taking place in 5A
15 through 5G?
16 MR. SCHLITTER: Objection, foundation.
17 THE WITNESS: 5A through --
18 BY MR. GIBSON:
19 Q. 5G.
20 A. I'd have to read the specification to
21 know what's going on here.
22 Q. Okay.
23 MR. GIBSON: Mark this as 1016.
24 (Document marked as Exhibit Number 1016
25 for identification.)

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1 BY MR. GIBSON:
2 Q. I'd just ask you if you've seen this
3 patent before today?
4 A. I don't recall ever seeing this patent.
5 Q. And again, if you'd look at Figs. 5A
6 through 5G, and I take it these are the same
7 figures we saw before.
8 Your answer would be the same, that you
9 would need to study this and read the
10 specification to provide testimony on it?
11 A. That certainly is my answer. I can take
12 that time now if you prefer.
13 MR. GIBSON: If we could mark this as
14 1017.
15 (Document marked as Exhibit Number 1017
16 for identification.)
17 BY MR. GIBSON:
18 Q. And I'd just ask if you've ever seen
19 Exhibit 1017 before?
20 A. I don't recall ever seeing this
21 document.
22 Q. And if you'd look at the last page, and
23 there's a -- there's a Fig. 9.
24 I take it you'd need to study this
25 patent and these figures in order to provide

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1 testimony about what Fig. 9 is?
2 A. I certainly would.
3 Q. And those three patents that I just
4 showed you, those were not in any way considered
5 by you in formulating your opinion either for the
6 '413 matter or the '204 matter?
7 A. I've never seen them before, so they had
8 no part in my opinion.
9 Q. If we could turn back to Sukegawa.
10 A. I've got it.
11 Q. And look at Fig. 2C.
12 A. I've got it.
13 Q. And if you -- 9 is the -- is the resin
14 insulating layer in 2C?
15 MR. SCHLITTER: Objection, form.
16 BY MR. GIBSON:
17 Q. Or second insulating film?
18 A. Is that a question?
19 Q. Yeah.
20 A. 9 is called the protective insulating
21 film and it would be an insulator.
22 Q. And that also -- there's another part of
23 9 over on the right-hand side?
24 A. In Fig. 2C, prior art to Sukegawa, there
25 is a small piece of that layer to the right side,

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1 yes. It's not labeled, but yes, it's there.
2 Q. And that's been opened up through an
3 etching step?
4 A. Well, the opening from that right
5 portion to the left portion was opened or was
6 etched to create the opening.
7 Q. And it's a -- it's a vertical opening?
8 MR. SCHLITTER: Objection, form.
9 THE WITNESS: I'm not sure what you mean
10 by "vertical opening."
11 BY MR. GIBSON:
12 Q. Well, the two -- the two walls on either
13 side of Fig. 2C are vertical?
14 A. They're illustrated as vertical.
15 Q. And that's one possible construction of
16 them, correct?
17 A. It's one possible.
18 Q. And, in fact, it's one of the preferred
19 constructions of them, correct?
20 A. I think it's a common consequence that
21 the side walls of these insulating layers as
22 they're being etched are largely vertical, if not
23 immeasurably so. But small variations from that
24 vertical, I don't think would have any consequence
25 to a person of ordinary skill and the issues that

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1 we're considering here.
2 Q. And would you agree that that -- well,
3 let me ask you this, what is part 10 or element
4 10?
5 A. Element 10 is the anisotropic conducting
6 film.
7 Q. And that's connecting to the transparent
8 conductive layer Number 8?
9 A. Yes, it is, on its lower surface, of
10 course, which is structured and has peaks and
11 valleys.
12 Q. Which in turn is connected to second
13 wire 7?
14 A. What are you referring to as being
15 connected to second wire 7?
16 Q. The transparent conductive layer 8.
17 A. 8 is in direct contact with 7 in this
18 figure.
19 Q. And 7 is also in direct contact with 2?
20 A. Through the openings of layer 3, it is
21 contacting layer 2.
22 Q. You would consider those to be in direct
23 contact, right, 7 and 2?
24 A. They are in direct contact through the
25 openings, yeah.

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1 Q. Would you also consider them to be in
2 electrical contact, 7 and 2?
3 A. I would consider that they are also in
4 electrical contact between 7 and 2 specifically.
5 Q. And would you agree that -- well, strike
6 that.
7 Do you have Shiba in front of you?
8 A. I don't think I do. I don't think I've
9 been given that yet. I'll look.
10 Q. I think you're right. I've given you a
11 lot of patents, but I didn't give you that one.
12 If we could mark this as 1018.
13 (Document marked as Exhibit Number 1018
14 for identification.)
15 BY MR. GIBSON:
16 Q. And this is one of the patents that you
17 reviewed, is that correct?
18 A. This is one of the patents I've
19 reviewed, commented on in my declaration.
20 Q. With respect to both the '413 and the
21 '204 patents?
22 A. Yes, with respect to both.
23 Q. If you'd look at Fig. 6.
24 A. I see it.
25 Q. And do you see sealant there?

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1 A. The sealant is element 113 on the right
2 side.
3 Q. And what is that -- what is under that
4 element?
5 A. Element 113?
6 Q. Yes.
7 A. Well, element 113, similar to Nakamoto
8 has -- is offset from the edge of the counter
9 substrate 500, and underneath element 113 are many
10 structures. The first structure that it counters
11 is the insulating layer 241. The next element
12 that it -- in going down from the sealant would be
13 the wiring 127, and proceeding onward, the next
14 element is gate dielectric 211 and then finally
15 the substrate 200.
16 Q. So you would agree that the wiring units
17 127 are running under the sealant in Shiba?
18 A. Some -- a portion of the wiring 127 lies
19 under the sealant, largely along the direction of
20 the sealant.
21 Q. If we look at -- back at Sukegawa and 2C
22 again.
23 A. I've got it.
24 Q. And I think you have some opinions that
25 if lines 7 and 8 were extended, that there would

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1 be a problem with the sealant having to adhere to
2 line 8. And I want to make sure I understand what
3 you're trying to say.
4 MR. SCHLITTER: Objection, form,
5 foundation.
6 THE WITNESS: Well, can you point me to
7 the discussion in my disclosure that you're
8 referring to?
9 BY MR. GIBSON:
10 Q. Look at paragraph 174, page 92.
11 A. Do you have a specific question or do
12 you just want me to discuss what I'm talking about
13 in that paragraph?
14 Q. No, I want to understand. If you're
15 looking at -- we're looking at Fig. 2C.
16 If you're going to have lines 7 and 8
17 continue to the left, aren't they going to remain
18 covered by 9?
19 A. Well, first, it's clear that every
20 example given in Sukegawa, those wiring lines end
21 before they reach the sealant or the display
22 portion. So that's the explicit disclosure in
23 Shiba.
24 Now, if those lines were extended
25 despite that fact, then indeed line 8 and 9 -- I'm

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1 sorry, line 8 and 7 would remain under the
2 insulating film 9, but that's not the case that
3 I'm referring to in this paragraph, because this
4 paragraph 174 in my disclosure is referring to a
5 transparent conductor that's been deposited
6 according to the Claims 1, which requires that the
7 transparent conductor be deposited through the
8 opening in the insulating film. In this Fig. 2C,
9 it would be element 9.

10 So that's not what's shown here. So if
11 we -- in this hypothetical, if Sukegawa was
12 modified so that the ITO layer was deposited
13 through that opening and then extended, well,
14 then, of course, the ITO would be above and would
15 then be in contact with the sealant. Because
16 there's no disclosure in Sukegawa to end the ITO
17 before getting to the sealant, the ITO in Sukegawa
18 is always for corrosion protection of the layer 7.

19 Q. Right. One of ordinary skill in the art
20 would know that you wouldn't want to have the ITO
21 layer be the layer that the sealant would bond to.

22 We went over that, right?

23 A. Well, we have the teaching of Sukegawa
24 that this ITO layer is intended to protect the
25 corrosion of element 7. And so if someone was

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1 beginning with Sukegawa and was -- was applying
2 it, then a person of ordinary skill would keep it
3 despite the adhesion challenges that it may
4 present.

5 Q. But we also know that one of ordinary
6 skill in the art is going to want to have a better
7 bonding and better adhesion, correct?

8 A. Well, as we also discussed, that kind of
9 question has to be decided in view of the many
10 constraints in the display system. So Sukegawa is
11 explicitly disclosing a solution for corrosion
12 resistance of these -- these wirings, especially
13 in the terminal portion.

14 Q. But if I take and deposit 9 before 8,
15 which is what you're suggesting --

16 A. I'm not suggesting that Sukegawa would
17 do that but, of course, that's what Claim 1
18 requires in the '413 patent.

19 Q. If you deposit 9 before 8 and you're
20 still going to have -- and you then open up 9 to
21 allow 8 and 7 to connect, you're still going to
22 have corrosion protection, right?

23 A. You would only have corrosion protection
24 to the extent that you continue to cover all of
25 wiring 7 with both insulating film 9 and 8.

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1 That's the clear teaching of Sukegawa. Everywhere
2 that you have wiring 7, you have double coverage.
3 That's central to his invention.

4 Q. And you would still have that if you
5 flipped the two layers, right?

6 A. You would only have that if you extended
7 element 8, the transparent conductor, along with 7
8 to the left off this picture in this hypothetical.

9 Q. Why can't it just end the way it is now?

10 A. It's possible, but that's not the
11 disclosure in Sukegawa. Sukegawa says it's
12 central and important to prevent corrosion of the
13 terminal to have double coverage over element 7 to
14 prevent the pin holes and wiring corrosions that
15 are -- some of which are identified in Fig. 2B
16 right above.

17 Q. Now, I take it that you would agree that
18 it's obvious for one of ordinary skill in the art
19 to open up the insulation layer to allow two
20 metals to connect?

21 MR. SCHLITTER: Objection, foundation.

22 THE WITNESS: Can you rephrase --
23 perhaps be more specific?

24 BY MR. GIBSON:

25 Q. Well, the prior art, even prior art to

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1 Sukegawa 2C, you're seeing someone open up an
2 insulation layer, layer 3, to connect two metal
3 layers, correct?

4 A. That's what's going on in -- in the
5 connection between element 7 and 2 through the
6 openings in layer 3, certainly.

7 Q. So as of 1997, that would be obvious to
8 one of ordinary skill in the art, that's a way to
9 connect two wires is to open up the insulation
10 layer and then deposit the second metal?

11 A. That's one way --

12 MR. SCHLITTER: Objection, foundation.

13 THE WITNESS: That is one way a person
14 of ordinary skill would -- could do a connection
15 between two -- two metal wirings or two conductors
16 with an insulator in between.

17 BY MR. GIBSON:

18 Q. That would be obvious in 1997 given the
19 prior art that we're looking at in Sukegawa?

20 MR. SCHLITTER: Objection, foundation.

21 THE WITNESS: It's one of the many
22 options.

23 BY MR. GIBSON:

24 Q. Is it nonobvious or is it obvious as one
25 of the many options?

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1 A. I'm not sure what you mean. It is
2 clearly disclosed in the prior art to have through
3 holes to connect two conductors through those
4 holes or to make contact through those holes.
5 Q. There's nothing novel about that in
6 1997?
7 A. No, there's probably six decades before
8 that where that would also be true.
9 Q. When you say that if you were going to
10 flip the layers under Sukegawa and still maintain
11 protection against the corrosion that you'd have
12 to extend the wires further than we see in 2C,
13 what do you -- what exactly do you mean by that?
14 MR. SCHLITTER: Objection, form.
15 THE WITNESS: Well, if we hypothesize
16 that a person takes Sukegawa and does not follow
17 his disclosure, but instead extends wiring 7 off
18 the picture to the left, my point is that if a
19 person does that, then Sukegawa teaches that this
20 person must also extend the transparent
21 conductor 8.
22 And if we're forming 8 last so that it's
23 through the opening in 9, then that would
24 necessarily also have to follow to provide that
25 double coverage all along the length of wiring 7.

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1 That's the key disclosure of the invention in
2 Sukegawa is double coverage protecting layer 7.
3 BY MR. GIBSON:
4 Q. Why would you need to extend wiring 7?
5 A. Sukegawa teaches that wiring 7 is prone
6 to corrosion and that it's important to have
7 double barriers to protect it and this is his --
8 his way to achieve that everywhere.
9 Q. Well, but Fig. 2C doesn't show the
10 wiring 7 going any further.
11 A. That's exactly right. There's no
12 example in Sukegawa where wiring 7 extends outside
13 this terminal region toward the sealant.
14 Q. And why are you saying that you would
15 extend -- if you -- if we deposited 9 before 8,
16 why are you saying that 7 would then have to be
17 extended?
18 MR. SCHLITTER: Objection, form.
19 THE WITNESS: Well, it's less that I'm
20 saying it. I'm saying that Sukegawa goes on and
21 on and on about this. If you consider the prior
22 art figures that we're looking at here, 2A, 2B,
23 2C, Sukegawa lays out why the prior art is
24 failing. And the reason the prior art is failing
25 is because in this open region, this opening in

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1 layer 9, the only thing protecting wiring 7 is the
2 ITO layer 8 or the transparent conductor 8.
3 And that's a single layer of coverage
4 and his key observation is that that's not good
5 enough. And so he invents in Fig. 3 -- is one
6 example of his invention. He has others. He has
7 a scheme where he provides double coverage where
8 everywhere on wiring above wiring 7 there's two
9 things that protect it, including element 8, 9 and
10 10 in his invention.
11 BY MR. GIBSON:
12 Q. Is that in both the terminal portion and
13 the display portion?
14 A. It's not because he only has wiring 7 in
15 the terminal portion. So it's not in the display
16 portion at all. This wiring doesn't extend into
17 the display portion.
18 Q. Why don't we look at paragraph 39 of
19 your declaration?
20 A. I see it.
21 Q. And you're describing the invention of
22 the '413 patent here?
23 A. That's the subject I'm commenting on,
24 the aspects of the invention, the '413 patent.
25 Q. And you write, "Furthermore, in order to

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1 improve the reliability of an LCD by providing for
2 the sealant to have favorable adhesion, this
3 invention provides a structure where the sealant
4 does not overlap the ITO film."
5 Do you see that?
6 A. I do.
7 Q. Is there anywhere in the specification
8 that the patent, the '413, talks about the sealant
9 having favorable adhesion?
10 A. I don't recall that that phrase is in
11 the specification.
12 Q. Anything similar to that phrase in the
13 specification?
14 A. Not that I recall, but here I'm
15 recognizing that it's true.
16 Q. As one of ordinary skill in the art in
17 1997 would know?
18 A. I can agree with that.
19 Q. Now, you would agree that Sukegawa
20 discloses a transparent conductive layer?
21 A. I do agree that Sukegawa discloses a
22 transparent conductive layer in his invention as
23 well as in the prior art that's cited.
24 Q. And would you agree that that's over a
25 second wiring, that disclosure?

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1 A. I wouldn't agree to that. If -- I would
2 disagree with that statement if we understand by
3 second wiring the same thing as in Claim 1 of the
4 '413 patent.
5 Q. But you would agree that there's -- that
6 in -- for example, in 2C in Sukegawa, there's a
7 second wiring 7?
8 A. Well, there is an upper wiring, as
9 Sukegawa calls it, that is in contact with layer 2
10 through the openings of layer 3, and so that's
11 wiring -- that's wiring 7, but it doesn't meet the
12 claim limitations of Claim 1. So I hesitate to
13 call that the second wiring that's in Claim 1.
14 Q. And you're saying that because you think
15 the second wiring has to be put down in a
16 different order than what you're seeing in 2C?
17 A. That's part of it. But the other major
18 part is there needs to be a first region and
19 second region of the second wiring and there is --
20 there is not such a division of regions in
21 Sukegawa.
22 Q. You think there's just one region?
23 A. It depends.
24 Q. What does it depend on?
25 A. Well, are you asking me if the entire

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1 wiring 7 meets the limitations for the first
2 region in Claim 1?
3 Q. No, I'm asking you whether you think
4 there's only one region in Sukegawa?
5 MR. SCHLITZER: Objection, foundation
6 and form.
7 THE WITNESS: It depends on why you're
8 looking for regions. I can't say in general.
9 BY MR. GIBSON:
10 Q. Well, no, we're talking about the
11 language of the '413 patent. In '413 they
12 describe a first region and a second region?
13 A. That's true. There's a first region of
14 the second wiring that must have a transparent
15 conductive -- conductive layer over it. There's a
16 first region in the second wiring that must have a
17 flexible printed circuit over the first wiring.
18 Q. All right. So my question is there --
19 as you understand there being two regions in the
20 '413 patent, are you saying that Sukegawa, to one
21 of ordinary -- to a person of ordinary skill in
22 the art only has one region?
23 A. Well, at most it has one region, but
24 even that would not meet the limitations of the
25 claim because, for example, in element 6 of

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1 Claim 1 of the '413 patent, there must be a
2 transparent conductive layer over a first region
3 of the second wiring.
4 And if we go to a later claim element,
5 which I think is 13, that transparent conductive
6 layer must be in direct contact with that second
7 wiring through an opening in the second insulating
8 film.
9 So the transparent conductor doesn't
10 meet the claim element. And so how can I possibly
11 agree that there's a first region that corresponds
12 to what's in the Claim 1? I can't.
13 Q. And that's because of the order -- of
14 the order of the layers in the prior art described
15 in Sukegawa?
16 A. Yes, the reason that wiring 7 does not
17 have even a first region, let alone any other
18 regions, is because of the ordering of the
19 transparent conductor is, in Sukegawa at least,
20 not being through the opening of layer 9.
21 I'm sorry. It's not -- it's not in -- I
22 should say it's not in direct contact through an
23 opening in the second insulating film.
24 Q. But you would agree there's a second
25 wiring in Sukegawa?

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1 A. There is a numerically additional wiring
2 clearly, but it doesn't meet the claim language of
3 Claim 1 of the '413 patent.
4 Q. There's a -- there's a transparent
5 conductive layer?
6 A. Again, there is a transparent conductive
7 layer, but it doesn't meet the claim limitations
8 of Claim 1.
9 Q. And there's an FPC, a flexible printed
10 circuit?
11 A. There is that element, but it's -- it's
12 not meeting Claim 1.
13 Q. Would you agree that the FPC is
14 connected through an opening in layer 9?
15 A. It is maybe the only thing connecting
16 through the opening of layer 9.
17 Q. So you would agree with that?
18 A. I do agree with that.
19 Q. Would you agree that if layer 9 extended
20 over the entire transparent conductive layer 8,
21 that the device would not function?
22 MR. SCHLITZER: Objection, form,
23 foundation.
24 THE WITNESS: Can you tell me what you
25 mean by "function"?

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1 BY MR. GIBSON:
2 Q. It wouldn't serve its intended purpose.
3 A. I don't know about that, but if this
4 terminal region, which is also illustrated in --
5 from top down in other figures, you know, if
6 that -- if there were no opening in layer 9 for
7 contact to be had between the anisotropic
8 conducting film 10 and the layers below it, then
9 there would be no electrical connection, at least
10 in this portion. Of course it's possible to
11 provide it somewhere else.
12 Q. Right. But as you understand the prior
13 art that's described in 2C, there would be no
14 electrical connection provided from the FPC to the
15 conductive layer?
16 A. If this figure was modified simply so
17 that the opening that's illustrated was not there,
18 but was instead fully layer 9, then there would be
19 no contact between layer 10 and 8.
20 Q. And there would be no electrical contact
21 between 7 and 8 either, correct?
22 A. I disagree with that. In your
23 hypothesis, the only thing different was that the
24 layer 9 was -- was simply without the opening.
25 But since element 8, the transparent conductor, is

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1 deposited before layer 9, then the electrical
2 contact between 8 and 7 is already present. So
3 what -- what we do with layer 9 has no bearing on
4 the electrical connection between 8 and 7.
5 Q. If two things are touching, are they in
6 electrical contact?
7 MR. SCHLITZER: Objection, form and
8 foundation.
9 THE WITNESS: It would depend on what
10 those two things are.
11 BY MR. GIBSON:
12 Q. Two pieces of metal.
13 A. If two things are adjacent to each
14 other, then I would refer to that as direct
15 contact. And if they're both metals, they would
16 also be in electrical contact, but electrical
17 contact is not the same as direct contact.
18 Q. What's the difference?
19 A. In direct contact between two layers,
20 they would need to be adjacent to each other, at
21 least for some portion of their surfaces. Whereas
22 for electrical contact, there could be something
23 in between.
24 Q. And if you had a transparent conductive
25 layer touching a piece of metal, would you

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1 consider that to be in direct contact?
2 A. Can you give me the example, for
3 example, from the figure?
4 Q. If you have a transparent conductive
5 layer that's touching a piece of metal, would they
6 be in direct contact?
7 A. Well, referring to Fig. 2C, it sounds
8 like you're asking me if element 8 is in direct
9 contact with layer 7. Yes, it is.
10 Q. And would a transparent conductive layer
11 be in electrical contact if it's touching a piece
12 of metal?
13 A. At least to the extent that we're
14 talking about the contact in Fig. C between the
15 ITO and another metal, they would be in electrical
16 contact.
17 Q. What if there's no electricity flowing,
18 are they still in electrical contact?
19 A. Whether or not there's current or
20 potential in this situation has no bearing on
21 whether there's electrical contact.
22 Q. I take it you've read the Motion to
23 Amend that's been filed in the '413?
24 A. I have read it.
25 Q. And what's your understanding of it?

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1 A. I don't recall it very specifically, so
2 if you want me to, I'd prefer to review it so I
3 can answer your questions.
4 Q. Do you have an understanding that
5 there's been some -- a request -- should the
6 petition be granted, there's been a request to
7 amend some of the claims?
8 A. Yes, I do understand that that's the
9 purpose of the amendment.
10 Q. And there's been some request to then
11 add some limitations?
12 A. That's my understanding of that
13 amendment.
14 Q. Do you know what limitations are
15 requested?
16 A. Since I wasn't involved in writing it
17 and I really only read it once, I don't recall.
18 Q. When you look at Claim 1 of the '413
19 patent as an example, you see that it calls for a
20 first wiring over a substrate?
21 A. I do. I see that.
22 Q. Then it says there's going to be a first
23 insulating film over the first wiring?
24 A. Yes.
25 Q. And then the second wiring is going to

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1 go over the substrate and the first insulating
2 film?
3 A. Yes.
4 Q. And then the second insulating film is
5 going to go over the second wiring?
6 A. Yes.
7 Q. And then it talks about a transparent
8 conductive layer over a first region of the second
9 wiring, but it doesn't specify that it will be
10 over the second insulating film.
11 Do you see that?
12 A. The claim does not require that the
13 transparent conductor be over the second
14 insulating film. It requires instead that the
15 direct contact with the second wiring be through
16 an opening in the second insulating film. Having
17 a bit of the transparent conductor on top of the
18 second insulating film as illustrated in 4A is one
19 example.
20 Q. Is there another way to do that, to have
21 the transparent conductive layer not be over the
22 insulating film?
23 A. Well, if we refer to Fig. 4A in the '413
24 patent, an alternative would be to pattern the ITO
25 such that that vertical edge and plateau that's

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1 over the second insulating film wasn't there. It
2 may not be preferable, but it certainly could be
3 done and it would still meet the claim language or
4 the claim requirements.
5 Q. You're talking about that piece of the
6 ITO that's on the -- on the top of the insulating
7 resin?
8 A. I'm referring to the left side of what's
9 illustrated as the ITO. It's a kind of upside
10 down L. And so part or all of that could
11 certainly be removed and we would still have the
12 direct contact through the opening in the second
13 insulating film as required by the claim
14 limitation.
15 Q. Would you agree in 2C of Sukegawa that
16 the flexible printed circuit is in electrical
17 contact or direct contact through the opening?
18 MR. SCHLITTER: Objection, form,
19 compound.
20 THE WITNESS: To be specific, the
21 element 10 --
22 BY MR. GIBSON:
23 Q. We'll break it down into two pieces --
24 A. Okay. Go ahead.
25 Q. -- since there's a compound objection.

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1 Would you agree that the FPC is in
2 direct contact through layer 9 with -- to the
3 transparent conductive layer?
4 A. I'm trying to find out what element 31
5 is called. All right. So you asked me about a
6 flexible printed circuit, which is the language of
7 the '413 patent. In Sukegawa, that is composed of
8 several things or it comprises several things. So
9 it has a flexible wiring substrate 31. It has a
10 copper foil wiring 31B, and at least it also has
11 an anisotropic conducting film 10.
12 And depending on which of those or all
13 of those that you're referring to as a flexible
14 printed circuit, I would probably have to give
15 different answers. So let me answer you this way
16 and you can follow-up.
17 It is true that in Sukegawa, Fig. 2C,
18 that the anisotropic conducting film 10 is in
19 direct contact with the transparent conductor 8
20 through the opening of the insulator 9.
21 Q. Would you also consider that to be
22 electrical contact?
23 A. Element 10 is in electrical contact with
24 layer 8 because it is a direct contact and they're
25 both conductors.

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1 Q. And what's your issue with the -- the
2 FPC? You seem to quibble with that.
3 A. I'm mostly trying to bridge the
4 different languages between the '413 patent and
5 the Sukegawa patent. In the '413 patent, it's
6 simply a big block that's illustrated and referred
7 to as the FPC without much detail about what's
8 going on in there.
9 Q. Would you think that someone of ordinary
10 skill in the art in 1997 would understand that the
11 structure that's depicted in 2C that is in
12 electrical contact through 10 would be also
13 connectible or connecting to an FPC?
14 A. Well, looking at Sukegawa, I think a
15 person of ordinary skill would identify the entire
16 element 31 as forming the FPC and the anisotropic
17 conducting film 10 being something added to the
18 FPC to make the connection.
19 And so the claims that we have for the
20 '413 have a claim element that says that the
21 flexible printed circuit should be in electrical
22 contact with the second wiring through the
23 transparent conductive layer. So that's being met
24 because it's electrical contact, not direct
25 contact.

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1 Q. So I take it that you would have an
2 issue with Sukegawa showing a second wiring as
3 it's described in the '413 patent?
4 A. I think we've already discussed that
5 that's the case.
6 Q. All right. And you would also take
7 issue with Sukegawa showing either a first or a
8 second region as you've mentioned, correct?
9 A. I don't see a first region and certainly
10 not a second region in Sukegawa that meets the
11 claim limitations of the '413, Claim 1.
12 Q. When you look at Fig. 4A of the '413
13 patent, would you consider the auxiliary lines and
14 external connection lines to be in direct contact?
15 A. I do consider them to be in direct
16 contact through the opening in element 112, the
17 first inter-layer film as it's called in the
18 Fig. 4A.
19 Q. And you would consider them also to be
20 in electrical contact?
21 A. Yes.
22 Q. What about the ITO and the external
23 connection lines, do you consider those to be in
24 direct contact?
25 A. The ITO is in direct contact with the

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1 external connection lines through the opening in
2 layer 113.
3 Q. And you would consider them also to be
4 in electrical contact?
5 A. I would, yes.
6 Q. And you would consider the ITO and the
7 external -- I'm sorry -- the auxiliary lines to be
8 in electrical contact?
9 A. The ITO element 114 is in electrical
10 contact with the auxiliary lines 401 in Fig. 4A
11 through the external connection lines.
12 Q. And you would consider them not to be in
13 direct contact?
14 A. Yes, that's exactly right.
15 Q. Okay. And the FPC that's depicted,
16 albeit very generally in the -- in the Fig. 4A,
17 you would consider that to be in both direct and
18 electrical contact with the ITO?
19 A. Yes, that's right.
20 Q. If you look at Claim 2 of the '413
21 patent --
22 A. I see it.
23 Q. -- do you see using aluminum as any
24 point of particular novelty in 1997?
25 A. Using aluminum for the second wiring is,

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1 of course, one option of many.
2 Q. But in 1997, that wouldn't be
3 particularly innovative, would it?
4 A. It would be a preferred example, but
5 not -- not innovative to use aluminum for wirings.
6 Q. One of ordinary skill in the art would
7 know that aluminum was an option in 1997?
8 A. Yes.
9 Q. And if you look at claim -- Claim 4 --
10 A. I see it.
11 Q. -- in 1997, one of ordinary skill in the
12 art would know that a transparent conductive layer
13 could be made from an ITO?
14 A. Yes, I think that would have been clear
15 to a person of ordinary skill at the time of the
16 '413 filing.
17 Q. And, in fact, are you aware that
18 Sukegawa also discloses that?
19 MR. SCHLITTER: Objection, form.
20 BY MR. GIBSON:
21 Q. Are you aware that Sukegawa also
22 discloses that the conductive layer, the
23 transparent conductive layer can be an ITO?
24 A. Yes. I agree with that.
25 Q. Now, if you look at Claim 5?

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1 A. I see it.
2 Q. It says, "A liquid crystal display
3 device, according to Claim 1, wherein the first
4 insulating film comprises silicon nitride."
5 Would you agree that one of ordinary
6 skill in 1997 would have understood that that
7 would have been an option for the first insulating
8 film?
9 A. I do think that a person of ordinary
10 skill would have known that that material would
11 have been one of many choices that could be used
12 for the insulators throughout the Claim 1
13 structure.
14 Q. And are you aware that Sukegawa also
15 discloses that?
16 A. Yes, I am.
17 MR. GIBSON: Why don't we take a brief
18 break?
19 VIDEOGRAPHER: We're going off record.
20 This is the end of Media Unit Number 4. The time
21 is 4:37.
22 (Short recess.)
23 VIDEOGRAPHER: We're now back on record.
24 This is the beginning of Media Unit Number 5 in
25 the deposition of Dr. Michael Escuti and the time

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1 is 4:49.
2 BY MR. GIBSON:
3 Q. Now, one of ordinary skill in the art
4 would understand that if you have a deposit of a
5 second line -- second wiring and then an
6 insulation film on top and then an ITO layer on
7 top of that, that the way to connect those is to
8 create an opening in the insulation wire --
9 MR. SCHLITTER: Objection as to form.
10 BY MR. GIBSON:
11 Q. -- the insulation line?
12 MR. SCHLITTER: Form and foundation.
13 THE WITNESS: To some extent it does
14 depend on the situation. It's I don't think
15 possible to answer that in a vacuum without some
16 more context.
17 BY MR. GIBSON:
18 Q. Well, in 1997, if you were going to have
19 a structure that has a second wiring and then an
20 insulation layer on top of that and then a
21 transparent conductive layer and you want to
22 connect those two, one way to do that in 1997, it
23 was known to open up the insulation layer?
24 MR. SCHLITTER: Objection, form.
25 THE WITNESS: I can agree that it was

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1 known to a person of skill -- ordinary skill by
2 the time of 1997 that one way is to -- to connect
3 those two conductors would be to create an opening
4 in the insulator before the insulating -- before
5 the second conductor was deposited and thereby,
6 when you deposited the second conductor, it would
7 make contact with the first conductor that was put
8 down. It's called a through hole. It's also
9 called a contact hole, a via, right. There's many
10 standard names for that.
11 BY MR. GIBSON:
12 Q. And contact holes or through holes were
13 well-known in the art as of 1997?
14 A. They were very well-known to a person of
15 ordinary skill and the claim language, of course,
16 uses that terminology and specifies that the
17 contact should happen through the opening.
18 Q. But there was nothing innovative or
19 novel about using contact hole to connect two --
20 two wires or a conductive layer and a wire?
21 MR. SCHLITTER: Objection, form,
22 foundation.
23 THE WITNESS: I'm not sure I can comment
24 on -- on how innovative that is, but it was a
25 well-known technique to a person of ordinary skill

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1 to make contacts through openings in an insulating
2 film between two conductors.
3 BY MR. GIBSON:
4 Q. Now, it's your view that in the '413
5 patent, the claims are limited to the order of
6 materials as shown -- or the deposited materials
7 are in the order as shown in Fig. 4A?
8 A. It's my opinion that the sequence of the
9 elements that are disclosed here in Claim 1 is
10 uniquely specified. There are no materials
11 specified.
12 Q. Well, putting aside the materials, the
13 order of the manufacturing steps, you say in
14 Claim 1 they really correspond to what's in
15 Fig. 4A?
16 A. Fig. 4A is an example that corresponds
17 with the claim. It's not the only example, but
18 it's a good example.
19 Q. Is there some other example that you
20 could come up with?
21 A. Well, we discussed one example which
22 would be, for example, where the ITO portion does
23 not rise up over the second insulating film, but
24 instead just lies within the opening.
25 Q. But the manufacturing steps would still

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1 be the same in that situation, right?
2 A. That's correct.
3 Q. And the order of deposits would still be
4 the same?
5 A. The sequence of the manufacturing to
6 make the element in Claim 1, I believe is uniquely
7 specified.
8 Q. And it's always going to have the order
9 that's specified in 4A under your view of Claim 1?
10 A. And which order are you referring to?
11 Q. Well, you're going to have a substrate
12 first. You're then going to have your auxiliary
13 lines. You're going to have a first insulating
14 layer, then you're going to have external
15 connection lines, an ITO -- then you're going to
16 have external connection lines and a second
17 insulating layer and then your ITO layer.
18 That's going to be the order of deposit
19 as set forth in Fig. 4A and is what you say is
20 mandated also by Claim 1?
21 A. You didn't mention anything about the
22 first region and second region and the sealant.
23 But aside from that, the order of the elements
24 that you specified or that you listed I believe is
25 dictated by the language of the claim as is.

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1 Q. And it is -- Fig. 4A shows exactly what
2 you say Claim 1 describes, correct?
3 MR. SCHLITTER: Objection, form.
4 BY MR. GIBSON:
5 Q. In terms of the deposit of the layers?
6 A. Well, my declaration probably goes on
7 for several paragraphs on this, but the sequence
8 of layers that would need to be fabricated would
9 be understood by a person of ordinary skill to
10 proceed from the bottom up and would correspond to
11 what's shown in Fig. 4A, although not exclusively,
12 right, at least in terms of this an example, the
13 sequence would still need to be the same even in
14 other embodiments and other examples.
15 Q. That's my question.
16 Is there any other sequence, other than
17 what's shown in 4A, that would fall under the
18 claim language of Claim 1?
19 A. Could you rephrase the question?
20 Q. Yes. According to you, the Claim 1 has
21 a particular sequence of deposits, correct?
22 A. Yes.
23 Q. And Fig. 4A shows that sequence,
24 correct?
25 A. Fig. 4A is an example of that sequence

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1 of deposition and patterning as well, of course,
2 that does meet Claim 1.
3 Q. Focusing just on the deposition, is
4 there any other deposition that could be done
5 under Claim 1 other than what we see in Fig. 4A?
6 A. Well, yes, there are variations on that.
7 So, for example, electrical contact between the
8 first wiring and the second wiring should be
9 achieved through the opening in the first
10 insulating film. And so one additional layer that
11 could possibly be there would be if instead of the
12 second wiring extending into those openings, if
13 there was some other material, some other
14 deposition that was provided to accomplish that,
15 that would be one example that would achieve the
16 specified electrical contact between those two
17 layers through those openings, but would not be
18 the deposition steps. It would be an additional
19 step that would be involved.
20 Q. Okay. Focus on just -- we're only going
21 to have -- or strike that.
22 Whatever additions might be made, if
23 we're going to have an ITO, a second insulating
24 film or layer, a second wire, a first insulating
25 layer and a first wire, are they going to have to

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1 be put down in the order that's depicted in
2 Fig. 4A --
3 MR. SCHLITTER: Objection, form.
4 BY MR. GIBSON:
5 Q. -- in all circumstances under Claim 1?
6 A. The sequence of depositions in Claim 1
7 must proceed from -- in this figure from the
8 bottom up. And we can go through that sequence in
9 the claim if you'd like, but first as --
10 Q. If you need to refresh yourself,
11 that's fine.
12 I'm just trying to understand whether as
13 you read Claim 1, is there any way to do the
14 deposition order different than what you see in
15 Fig. 4A?
16 A. It depends. I may not be able to come
17 up with an alternate order right now, but
18 certainly the claim has a specific order and a
19 specific relationship between them. And it would
20 probably take me a little thought, extended
21 thought to see if I could come up with something
22 that was substantially different from Fig. 4A but
23 still met the claims.
24 What I can speak on is what the claims
25 require in terms of sequence and I have that in my

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1 declaration. We can say it again now.
2 Q. And what I'm trying to understand is, is
3 your -- is the sequence that you listed in your
4 declaration that's in Claim 1, is that different
5 in any way or can you think of a different one
6 that's not the same as 4A?
7 MR. SCHLITTER: Objection, form.
8 THE WITNESS: Well, the sequence that
9 I've discussed in my declaration does begin first
10 with the substrate, then there's a requirement
11 that there be a first wiring. Then there must be
12 a first insulator and there must be holes created
13 in it and then a second wiring needs to be applied
14 and deposited.
15 And then the second insulator must be
16 applied and an opening must be created in that.
17 And then finally, the ITO must then be formed
18 through the opening in the second insulating film.
19 That sequence must apply to any example or
20 embodiment that would meet Claim 1.
21 BY MR. GIBSON:
22 Q. All right. And my question still is, is
23 there anything other than Fig. 4A that would meet
24 what you just described?
25 A. There may be. I'm not prepared to limit

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1 it to Fig. 4A, as I've already said.
2 Q. But you can't think of any as you sit
3 here?
4 A. As I sit here --
5 MR. SCHLITTER: Objection, form.
6 THE WITNESS: As I sit here, I can't
7 think of an example beyond the one I already did
8 give you.
9 BY MR. GIBSON:
10 Q. Now, the order that you just gave in
11 your -- in your declaration, you believe that
12 order is required because of the use of the word
13 "through" an opening?
14 A. Well, part of it is required from the
15 word "over" that's used repeatedly and there's an
16 additional overlay. And then additionally, that
17 sequence is required by the phrases of "contact
18 through an opening" in various films. So they
19 altogether uniquely specify the sequence.
20 Q. And when you're looking at -- for
21 example, it's not always contact through an
22 opening as I think we discussed before, correct?
23 MR. SCHLITTER: Objection, form.
24 THE WITNESS: There is one use of the
25 word "through" which is not in that phrase, that's

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1 correct.
2 BY MR. GIBSON:
3 Q. That's in 1.12 in your declaration,
4 there's contact through the transparent conductive
5 layer?
6 A. That's correct. The electrical contact
7 is by means or via the transparent conductive
8 layer to the second wiring and the FPC. So in
9 other words, the second wiring and FPC are in
10 electrical contact because of the transparent
11 conductive layer. It's an alternate way to read
12 that.
13 Q. And when we look at 1.13 that does use
14 direct contact through an opening, you're using
15 the definition of "through" as because of?
16 A. Whenever --
17 MR. SCHLITTER: Objection, form.
18 THE WITNESS: In both uses of the phrase
19 in the claim, "contact through an opening," it --
20 a person of ordinary skill would hear that as
21 consistent with definition of via, because of,
22 certainly.
23 BY MR. GIBSON:
24 Q. And that's how you're using it in 1.13,
25 correct?

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1 A. That's how I clearly understand it and I
2 certainly think that one of ordinary skill would
3 -- would also have that singular understanding.
4 Q. And that's fundamental to your opinion
5 on this matter, correct?
6 MR. SCHLITTER: Objection, form.
7 THE WITNESS: Which opinion and which
8 matter specifically are you referring to?
9 BY MR. GIBSON:
10 Q. It's fundamental to your interpretation
11 of the order that these layers must be deposited
12 in, that definition of the word "through"?
13 MR. SCHLITTER: Objection, form.
14 THE WITNESS: I think so.
15 MR. GIBSON: And let me just have this
16 marked as the next, 1019.
17 (Document marked as Exhibit Number 1019
18 for identification.)
19 BY MR. GIBSON:
20 Q. And Exhibit 1019 has a couple different
21 depictions of two metals as well as an insulating
22 film. And if we -- let's assume that we're
23 depositing a metal 1 and then we want to form two
24 additional layers, a metal 2 and an insulating
25 film and then an opening to the insulating film so

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1 the two metals can be connected to a third metal
2 which we haven't depicted here.
3 Would you agree with me that the two
4 ways you can do that are what's shown here?
5 MR. SCHLITTER: Objection, form,
6 foundation.
7 THE WITNESS: Could you remind me what
8 you're asking me to assume?
9 BY MR. GIBSON:
10 Q. Yeah. We're going to lay down a first
11 metal. That's in yellow. You see metal 1?
12 A. Yes.
13 Q. And then we're going to have two
14 additional layers, a metal 2?
15 A. Are we talking about the first
16 illustration?
17 Q. We're talking about both.
18 A. Okay.
19 Q. We're going to have a metal 2 and an
20 insulating film and then we're going to have an
21 opening in the insulating film so the two metals
22 can -- which are touching each other can then be
23 connected to a third metal.
24 And what I'm asking you is, given that
25 construct, would you agree that these are the only

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1 two structures that would do that?
2 A. Which construct are you referring to?
3 Q. Either of these. What I'm asking you
4 is, assuming the facts that I gave you, the metal
5 layers, the insulating film and the need to
6 connect to a third layer, metal layer --
7 MR. SCHLITTER: Object.
8 BY MR. GIBSON:
9 Q. -- is there any other way that you can
10 think to depict that other than these two?
11 MR. SCHLITTER: Object to form.
12 THE WITNESS: I'm not trying to be
13 difficult, but I'm not sure I understand your
14 question.
15 BY MR. GIBSON:
16 Q. All right. Well, do you see that
17 there's a metal 1 that we've deposited?
18 A. Yes, yes, I see that.
19 Q. And we have a metal 2 that's in contact
20 with metal 1?
21 A. Well, I see the illustrations. I guess
22 part of what I'm missing is what's the sequence
23 that you're depositing these? Or what are you
24 assuming is the sequence of your deposition and
25 patterning?

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1 Q. What we're wanting to do is if you have
2 a -- two metals that are contacting each other and
3 you're going to have an insulating film and you
4 need to have -- and that insulating film -- in one
5 situation you've got the -- we'll take the top one
6 first.
7 In the first one, we've got the metal
8 deposited, right? And then we deposit an
9 insulating film over the metal, metal 1. We etch
10 out that insulating film so that we can deposit
11 metal 2, right?
12 A. I see that.
13 Q. And then metal 2 is deposited.
14 A. I see that.
15 Q. And so we've created an opening in -- in
16 the insulating film, correct?
17 A. Based on your assumptions and what you
18 just described, it sounds like you have created an
19 opening in the insulating film and then -- and
20 then deposited metal 2 through that opening, yes.
21 Q. Okay. And now we want to be able to
22 connect a third metal to metal 2 and metal 1.
23 Would you agree that first structure
24 would be able to do that?
25 A. I don't see the third metal, so I'm not

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1 sure what you're imagining.
2 Q. Well, just another metal layer.
3 A. If you're asking me can a third metal
4 layer be applied on top of this, well, surely.
5 And it can be patterned if desired.
6 Q. And it would be in electrical contact
7 with metal 2 and metal 1?
8 A. If it was simply deposited on this
9 structure that's illustrated in Exhibit 1019, then
10 part of it could be in electrical contact with
11 both metal 1 and metal 2.
12 Q. Now, if you look at the second one and
13 we deposit metal 1 first and then we deposit
14 metal 2, and then we deposit the insulating film,
15 we can then create an opening to metal 2 through
16 that insulating film, correct?
17 A. That is one way to realize the
18 structure. Of course you could -- you could have
19 an alternative way where first metal 1 is
20 deposited and patterned and then the insulating
21 film is deposited and then patterned and then
22 metal 2 somehow created. I mean, it's --
23 Q. Isn't that what we did just up above?
24 A. That would be consistent with what's
25 above.

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1 Q. And in the bottom example, we could also
2 connect a metal 3 through that opening in order to
3 achieve an electrical contact between metal --
4 with metal 2 and metal 1?
5 A. It sounds like a very similar question
6 to the first illustration, that an additional
7 metal could be applied to the second illustration.
8 And in that case, the -- if metal 3 was applied,
9 it would be applied through the opening that's in
10 the second illustration. Whereas, of course, in
11 the first illustration, it would not be through
12 any opening if a third metal was applied.
13 Q. Now, is there any other way that you
14 could see to -- using two metals and an insulating
15 film, a metal 1, metal 2 and insulating film, is
16 there any other way you could design this so that
17 you could then connect to a third metal layer?
18 MR. SCHLITTER: Objection, form.
19 THE WITNESS: So --
20 MR. SCHLITTER: And foundation.
21 THE WITNESS: I'm not quite clear on I
22 guess what structure you're asking me to create.
23 Could you --
24 BY MR. GIBSON:
25 Q. Well, if you're going to use two metal

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1 layers and an insulating film -
2 A. Three -- three elements, right, two
3 metals and one insulating film.
4 Q. One insulating film, and you're going to
5 have the first two metal layers in direct contact
6 and then you're ultimately going to want to create
7 a way that you can connect to a third metal, what
8 I'm trying to understand is, are these the only
9 two ways that you could use those layers?
10 A. I don't know. There might be a dozen
11 other ways.
12 Q. Can you illustrate one of those for me?
13 A. If you would like, I can.
14 Q. Okay.
15 A. On this exhibit?
16 Q. Sure.
17 A. Well, you've -- if I hear you right,
18 you're saying there's a metal 1, and there's a
19 metal 2 and you're asking me are there other ways
20 than what's illustrated in these two where we
21 could connect them.
22 Q. No, metal 1 and metal 2 will be in
23 direct contact.
24 A. In direct contact, okay, and have there
25 be an insulating film somehow?

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1 Q. Yes, and you'll be able to connect to a
2 third metal.
3 A. Sure. So one example would have first
4 the metal 1, then another deposition before the
5 insulator of metal 2. And then you could apply --
6 it's really where you want to apply the insulating
7 film, but the insulating film could be, for
8 example, here or here, however you would like.
9 And then in one or more of these regions you could
10 apply metal 3.
11 There are dozens of ways to do that,
12 right. You could fill this with metal 3. You
13 could fill it -- or just part of it. You could
14 create the opening. You could create the opening
15 in the insulating layer just over the metal 2. I
16 mean, there are many ways, right.
17 Q. But you're just moving the insulating
18 layer over in that one, and the metal layer?
19 A. Well, I'm trying to answer your question
20 of other means to connect the three metals. You
21 know, this is another way that's not represented
22 here.
23 Q. Let me just show you this.
24 (Document marked as Exhibit Number 1020
25 for identification.)

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1 BY MR. GIBSON;
2 Q. And do you recognize Exhibit 1020?
3 A. I do.
4 Q. And what is Exhibit 1020?
5 A. It's a figure that's -- that I've
6 created or prepared and it's included in my '204
7 declaration.
8 Q. All right. And what were you trying to
9 illustrate with that?
10 A. I can comment on what's shown, but I
11 would need my disclosure to remind myself
12 specifically what I was talking about in reference
13 to it.
14 Q. Okay. Why don't you just comment on
15 what's shown? Part -- your declaration has
16 similar paragraphs, but sometimes you didn't
17 include all the nice pictures in the '413 as you
18 did in the '204.
19 A. Well, Fig. C is showing -- they are
20 color figures and so in this black and white it's
21 a little less clear, but the pad 751 is the first
22 conductor over a substrate. And immediately on
23 top of that is an ITO layer and after that and
24 above both of those on the Fig. C side is the
25 insulating layer, it's protective overcoat 241

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1 using the language of Shiba.
2 So this is a hypothetical structure
3 using the language and labeling that's in Shiba
4 that, in my opinion, would be -- would correspond
5 to the application of the teaching in Sukegawa to
6 create an ITO layer in the context of Shiba.
7 Q. And which figure from Shiba are you
8 using? Are you using Fig. 4 again or a different
9 one?
10 A. Let me make sure. It's my expanded view
11 of the left side of Fig. 4. Of course there's
12 many things not shown as well, but that's the
13 basic idea.
14 Q. All right. And I know that there's
15 different shadings here, the bottom layer, what
16 did you say that again, that's the pad 751?
17 A. Well, the -- yeah, with the colors it's
18 more helpful.
19 Q. Yeah, it's in orange in your
20 declaration.
21 A. There's an orange and then --
22 Q. It's then gray and then blue.
23 A. Okay. So the orange -- I mean, it's
24 also in the Fig. A and B that we had referred to.
25 So the large rectangle at the bottom is the

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1 substrate. The first layer that's shown there is
2 -- corresponds to the gate dielectric 211. And
3 then the next smaller rectangle, smaller at least
4 from left to right, would be the pad 751, a
5 conductor.
6 Q. It's another metal?
7 A. Well, it's the first metal in this -- in
8 this terminal.
9 Q. And then you have the ITO layers on top?
10 A. So I'm taking the terminal portion of
11 Fig. 4 in Shiba which begins from the substrate
12 and then the dielectric and then the first
13 conductor is this -- at least in this portion,
14 this pad 751. There's no other conductors below
15 it.
16 And I'm hypothesizing applying the
17 teaching in Sukegawa to create an ITO layer in the
18 terminal region and if that was done, it would
19 necessarily be below protective overcoat 241. I
20 don't think it's obvious to a person of ordinary
21 skill to do that, but I'm hypothesizing that if it
22 is done, then Fig. C on the left is what would
23 result.
24 Q. And what's going to be connected to the
25 ITO or what's going to go on top of the ITO?

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1 MR. SCHLITTER: Objection, foundation.
2 THE WITNESS: In this -- in this
3 hypothesis?
4 BY MR. GIBSON:
5 Q. Uh-huh. Yes.
6 A. Again, I'd have to see my declaration to
7 see what the discussion was specifically. I don't
8 think I commented on that.
9 Q. Would you agree with me that what you've
10 drawn in 1020 is -- strike it.
11 Well, Fig. D in 1020 is similar to the
12 top of Exhibit 1019?
13 A. What's 1019? Oh. It's similar in the
14 sense that the -- there's a metal 1 and then
15 there's a conductor that in 1019 is called
16 metal 2, but in Fig. D, it's an ITO layer, which
17 is not a metal. It's a conductor, but it's not a
18 metal.
19 Q. But the way you would go about creating
20 Fig. D would be you're depositing -- I guess the
21 gate dielectric's going to go first, but then
22 you're going to have your first conductor, then
23 you're going to deposit the protective overcoat.
24 Then you're going to deposit -- then you're going
25 to etch the protective overcoat and then you're

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1 going to deposit the ITO?
2 A. That sequence of elements is the way
3 that I think Fig. D could be constructed. I think
4 pad 751 is just that, it's the pad here. It's not
5 what I would point to as a first wiring in this
6 discussion, but it is a metal and it's -- it's
7 applied. And then the insulator could be -- would
8 need to be applied and then an opening created in
9 it and then finally the ITO deposited and
10 patterned after that.
11 Q. And those are the steps that we're
12 seeing in the first -- the first drawing on
13 Exhibit 1019. We have a metal 1, then an
14 insulating film, then second, in this case,
15 metal 2 but it could also be a conductive layer?
16 A. If we're not concerned about what the
17 conductor material is made of, then it is the same
18 between Fig. D and the upper illustration of 1019.
19 Q. Okay. And then in Fig. C, what are you
20 showing happening in Fig. C?
21 A. Isn't that what I just commented on?
22 Q. I think we were dealing with Fig. D.
23 A. Okay. Well, Fig. C represents what I
24 think would result from beginning with Shiba and
25 having a person of ordinary skill apply Sukegawa

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1 to Shiba. I don't think that's appropriate. I
2 don't think it's obvious to do so. But if that
3 was done, the structure that would result would be
4 Fig. C.
5 Q. And the order of the steps, what would
6 those be?
7 A. Well, the order of the steps would, like
8 in Shiba, be the conductors that would wind up
9 being, at least in this figure, first applied to
10 be pad 751. That would have to be patterned.
11 Then an ITO layer would need to be applied, and
12 then finally, protective overcoat and then that
13 would need to be patterned to have an opening.
14 Q. Would you agree that in Exhibit 1019,
15 we're seeing those same steps, seeing a metal 1
16 deposited first, then you're seeing a metal 2,
17 which in your Fig. C is an ITO, and then we have
18 the insulation film, that order?
19 MR. SCHLITTER: Objection, form.
20 THE WITNESS: The order that -- of
21 deposition and patterning steps appears to be the
22 same and I think would appear to be the same for a
23 person of ordinary skill between Fig. C and the
24 second figure in 1019.
25

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1 BY MR. GIBSON:
2 Q. Now, what you drew at the bottom of
3 Exhibit 1019, could you apply that to Sukegawa
4 somehow?
5 A. It sounds like you want me to speculate
6 on --
7 Q. I'm just asking if --
8 A. -- something.
9 Q. No, I don't want you -- I don't want you
10 to speculate at all. That's never -- that's never
11 what I'm asking you to do.
12 What I want to know is, what you drew in
13 Exhibit -- at the bottom of Exhibit 1019, is that
14 a structure that you think one of ordinary skill
15 in the art would apply to Sukegawa to modify it?
16 MR. SCHLITTER: Objection, form and
17 foundation.
18 THE WITNESS: It depends. I mean, my
19 figure was in response to your request that I
20 imagine another way to connect three metals and an
21 insulator.
22 BY MR. GIBSON:
23 Q. Right.
24 A. And there are more. There are many more
25 than what I've just shown here.

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1 Q. Now I'm narrowing it.
2 A. Now you're asking if this -- if I can
3 imagine a way that this could be applied to the
4 teaching in Sukegawa.
5 Q. Yes, just as you did with exhibits --
6 with your Figs. C and D.
7 A. Well, of course in that case, I was
8 applying the teaching of one patent to another and
9 considering what would result.
10 In this case, it's -- it's an arbitrary
11 connection of three metals and an insulator
12 without a context. It's -- it would be hard for
13 me to do that. I think I can't imagine, as I'm
14 here now, where it would be obvious to a person of
15 ordinary skill to employ this kind of structure in
16 Sukegawa. There's no teaching against it, of
17 course.
18 Q. Are there -- in looking at your Figs. C
19 and D, when you applied the teachings of Shiba to
20 Sukegawa, did you see a third option beyond a
21 Fig. C and D?
22 A. To be a little more clear, it was really
23 applying the teaching of Sukegawa to Shiba.
24 Q. Okay.
25 A. And --

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1 Q. Thank you for the clarification.
2 A. These were the two -- well, Fig. C is
3 what I think would result and I think a person of
4 ordinary skill would see as possible, even though
5 I don't think that combination is obvious.
6 Fig. D is what it would have to be to
7 read on our claim in the '413 patent because in
8 Fig. D, the ITO layer, the transparent conductor,
9 is being applied through the opening of the second
10 insulating film. Although, I mean, let's also be
11 clear that there is no first insulating film in
12 these figures. It's simply an insulating film.
13 Q. I'm just asking you, is there a third
14 option that you see applying Sukegawa to Shiba or
15 are these the only two?
16 A. There is a third option. I think it's
17 important to mention. If Shiba is taken by a
18 person of ordinary skill and really without
19 modification to the processing steps an ITO layer
20 is created in the terminal portion, then this ITO
21 would form beneath pad 751. It would be below
22 751. So that's a third -- third example. I talk
23 about it, but I don't illustrate that.
24 Q. Can you draw that?
25 A. Should I draw it on 1021?

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1 Q. Please. 1020 I think that is.
2 A. I'm sorry, 1020. (Indicating.)
3 So I've drawn it there. That's the most
4 natural variation of Shiba to a person of ordinary
5 skill to achieve ITO in the terminal portion
6 without changing the manufacturing of the display.
7 Q. But Sukegawa would suggest putting the
8 ITO layer above, right, for protection?
9 A. That's the teaching of Sukegawa, but
10 it's this third figure that I've drawn that is
11 trivial and obvious to a person of ordinary skill,
12 not the Sukegawa combination.
13 Q. But a person of ordinary skill would
14 recognize that you'd want to put the ITO layer on
15 top to avoid corrosion?
16 A. Well, a person beginning with the
17 disclosure in Shiba would recognize that Shiba is
18 intended to minimize and not increase the
19 manufacturing steps as well as other objectives
20 that have to do with the width of the seal region
21 and those kind of things.
22 And so Sukegawa's objective and
23 disclosure is towards something very different,
24 right. It's the corrosion protection. And some
25 of those objectives are either just different or

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1 counter.
2 Q. If you could turn back to Exhibit 1014,
3 this is the modified Shiba. You have that in
4 front of you?
5 A. I do have it.
6 Q. I want to make sure I understand where
7 the three capacitors are.
8 A. There's two capacitors.
9 Q. Okay. You're saying there's two
10 capacitors and the first one is in pink?
11 A. Well, a capacitor is formed with three
12 elements. The first element would be a conductor.
13 That would be the pink element. The rest of the
14 capacitor would be the dielectric, which is in
15 orange. I guess it's 211. And then finally, the
16 black or dark brown illustrated here as an
17 extension of the source electrode 231.
18 Q. Okay. So that's -- that's one
19 capacitor.
20 And what is the second one, just the
21 pixel electrode itself?
22 A. Well, no. All capacitors have to have
23 two conductors and an insulator somehow in
24 between. So the other one begins with the source
25 electrode 231, proceeds up where the insulator is

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1 the protective overcoat 241 and then the final
2 conductor is pixel electrode 271 in this
3 illustration.
4 Q. I see. And that forms a second
5 capacitor?
6 A. It's a --
7 MR. SCHLITTER: 251.
8 THE WITNESS: I'm sorry, yes, 251 is the
9 pixel electrode. So those three elements form an
10 additional capacitor that is, in principle, in
11 series with the first.
12 BY MR. GIBSON:
13 Q. Okay. And the source electrode is part
14 of both capacitors?
15 A. Yes. This sounds like a fairly hard
16 final exam question that I give my electromagnetic
17 students where I ask them to derive the
18 capacitance of the three electrode capacitor.
19 Q. I'm hopeful that this is all very
20 challenging.
21 Would you agree that the pixel electrode
22 and the source electrode are in contact?
23 A. They have a small bit of contact limited
24 on the right side of this illustration, yes.
25 Q. That's where the blue is touching the

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1 black?
2 A. Yes.
3 Q. Would you agree that because they're in
4 contact, no charge can be stored?
5 A. I would not agree with that because the
6 signals in this portion are changing in time and
7 so it's not a static situation. It's something
8 that has fairly high frequency signals going on.
9 If it were static and this was a display
10 that was in the same image and nothing was
11 changing in this electrical portion, then they
12 would -- that may be, but that's not the case
13 here, right. There's going to be time varying
14 signals that are fairly high frequency.
15 Q. So are you saying there would be a
16 voltage difference between these two?
17 A. Oh, there certainly could be a voltage
18 difference between the pixel electrode 251 as
19 illustrated here, and the source electrode 231.
20 It would depend on the signals that are going
21 through.
22 Q. Now, you would -- and you would agree,
23 though, the first capacitor you identified already
24 exists in Shiba? It's the second one that you're
25 pointing to as potentially causing an issue?

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1 A. By "first capacitor," do you mean the
2 capacitor formed by the capacitor line Cj and the
3 extended source electrode 231?
4 Q. Yes.
5 A. That's not disclosed in Shiba at all, of
6 course.
7 Q. Do you think there's a capacitor in
8 Shiba?
9 A. There certainly is a capacitor in Shiba
10 and it's formed between the capacitor line Cj and
11 the pixel electrode 251 with the gate dielectric
12 211 in between.
13 Q. So why don't you turn to paragraph 62?
14 A. In my declaration?
15 Q. Yes. I'm not sure that's the --
16 actually the right paragraph. I don't think
17 that's the right paragraph.
18 Let me ask you this, in 1997 -- well,
19 probably going to need you to have the '403 patent
20 in front of you. If you look at Fig. 4A --
21 A. Do you mean the '413 patent?
22 Q. I'm sorry, the '413 patent, Fig. 4A.
23 A. I see it.
24 Q. Too many patent numbers in the case.
25 I think we covered this a little bit

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1 before, but the connection that's being made
2 between the lines 401 and 403 through the
3 inter-layer film, that's something that was known
4 in 1997 before the '413 patent, correct?
5 A. Making connections through openings in
6 an insulating film similar to what's represented
7 here was well-known to a person of ordinary skill.
8 And that phrase "contact through an opening" is
9 representative of that enigmatic term in the art.
10 Q. Would you consider this to be a
11 multi-layer wiring?
12 MR. SCHLITTER: Objection to form.
13 THE WITNESS: What specifically are you
14 asking about?
15 BY MR. GIBSON:
16 Q. The connection between -- well, not the
17 connection, but the way that 111 and -- 111 --
18 sorry -- 401 and 403 are depicted in Fig. 4, would
19 you consider that to be multi-layer wiring
20 structures?
21 A. I would not.
22 Q. Why not?
23 A. And I also don't think a person of
24 ordinary skill would call it that in this context.
25 Well, the specification in the '413 and the claims

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1 refer to those elements 401 and 403 as separate
2 wirings, a first wiring and a second wiring in the
3 claim.
4 Of course it has different words in the
5 figure, and so this is a single connection that
6 involves two wirings, but I don't think it's fair
7 to characterize this as a multi-layer wiring.
8 Q. What would you characterize as a
9 multi-layer wiring?
10 A. What would I characterize as a
11 multi-layer wiring?
12 Q. Yes.
13 A. It would depend on the context.
14 Q. Can you give me an example?
15 A. I can. Several of these patents refer
16 to a conductive path, a bus line or a scan line or
17 data line that's formed with two metals, chromium
18 first in a thin layer and then aluminum in a
19 thicker layer. In many contexts, that's
20 multi-layer wiring.
21 Q. Would you consider that kind of wiring
22 to be well-known in 1997?
23 A. I would.
24 Q. And what's the advantage of the
25 structure that's shown in Fig. 4A in terms of the

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1 two wires and how they're connected through the
2 insulation film?
3 A. Are you referring to the -- what's
4 labeled as 401 and 403?
5 Q. I am.
6 A. There's at least two advantages that I
7 think are identified in the spec that -- at least
8 as best I recall, first these lines, of course,
9 extend to the left in this illustration and go
10 across the sealant and that can be -- and so going
11 from the right side, the terminal portion, to the
12 left under the sealant in this illustration would
13 mean that the resistance of that connection from
14 the right side, the terminal in this illustration
15 to the left through the sealant, that resistance
16 is lowered.
17 An additional benefit or advantage is
18 that the -- there's redundancy in those wirings
19 and in this structure. So that's definitely an
20 advantage in this context.
21 Q. And in 1997, were those advantages
22 well-known to someone of ordinary skill in the
23 art?
24 A. In this context, no.
25 Q. I don't mean -- I don't know what you

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1 meant by "in this context," but what I'm saying,
2 having a -- two wires connected through an
3 insulation layer, were there advantages to those
4 that were known to people of ordinary skill in the
5 art in 1997?
6 A. For a terminal connection in an LCD that
7 was not -- not known to a person of ordinary
8 skill. Sukegawa comes maybe the closest, but he
9 ends the upper layer -- upper metal wiring every
10 time in his disclosure.
11 Q. Were there -- are you aware of other
12 instances where you have two wires that are
13 connected through a contact hole prior to the '413
14 patent?
15 A. Well, I suppose nearly every
16 microelectronic circuit -- circuit since circuits
17 began being integrated and patterned in
18 semiconductor processes had two wirings connected
19 through a hole and an insulating layer.
20 Q. And can you give some examples of those?
21 A. Well, that kind of connection is very
22 common in semiconductor chips where there are
23 typically multiple levels of wiring and CPUs,
24 graphics chips, wi-fi chips. And in those cases,
25 I think there are connections made between those

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1 wirings.
2 Q. Any others?
3 A. Any others of examples of contacts being
4 made through an opening between two conductors?
5 Q. Right.
6 A. I can't specifically name them, but they
7 must be in just about every electronic circuit
8 that we have in our pockets and on this table and
9 they would have been similarly in 1997. But, of
10 course, in Claim 1, it's not simply that they're
11 connected, but there's other claim elements that
12 show this advantage in the terminal region to
13 accomplish something specific.
14 Q. And why would they have been -- prior to
15 1997, what were the advantages of connecting these
16 two lines through a contact hole?
17 MR. SCHLITTER: Objection, form.
18 THE WITNESS: In the terminal region --
19 I mean, I can't really hypothesize and speculate
20 on what's possible. I don't think that's why I'm
21 here, but I can turn to Sukegawa and comment on
22 why he is doing it and why the prior art that he
23 cites does it. And I'd be glad to do that.
24 BY MR. GIBSON:
25 Q. And why is that?

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1 A. Well, he explains that he uses this
2 structure of wiring contact 7 and contacting
3 wiring 2 through the opening in 3 to -- well, to
4 ensure a corrosion-resistant terminal in
5 combination with the other elements.
6 And I think -- I don't know if he
7 explicitly says this, but I would recognize that
8 that structure helped Sukegawa in the peeling
9 operation because it provides a rough surface with
10 peaks and valleys so that the anisotropic
11 conductor can better connect in his context than
12 it would be if it was a flat layer.
13 And if the FPC had to be removed, if the
14 checking terminal failed, then there would be
15 redundancy in that portion, in the terminal
16 portion, so that wirings would still be left
17 behind even if some of them came off.
18 Q. How does creating an opening in the
19 insulation wire help improve corrosion or
20 resistance to corrosion?
21 A. Well, it makes it much more challenging.
22 You can see in Fig. 2B of Sukegawa, he's got a
23 pin hole illustrated 11 and what's illustrated as
24 the corrosion that can happen which could -- it's
25 illustrated as if the material was literally

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1 removed, but I think what's more likely is
2 material oxidizes or has some kind of chemical
3 change so that it's no longer a good conductor.
4 So if layer 7 and layer 2 were simply
5 flat and laid on top of each other, there would be
6 immediate degradation -- or the potential would be
7 immediate degradation more rapidly than in this
8 structure where the corrosion would have to go
9 around other structures.
10 Q. And this is obviously -- 2C and 2B are
11 prior art that weren't dealing with the corrosion
12 issue, right?
13 A. I'd have to read the specification to be
14 sure. It is prior art. I'm not so sure that they
15 don't deal with corrosion. I think what he's --
16 as best I recall, what he does is he refers to
17 this prior art to say in these cases, there's only
18 a single layer of protection that's provided in
19 this region through the transparent conductor 8
20 and he's illustrating the case that this is not
21 good enough for his purposes. But until Sukegawa,
22 at least in some cases, that was good enough.
23 Q. And what I want to try to get at is,
24 before Sukegawa, you have two lines being -- two
25 wires being connected through an insulating

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1 opening, correct?
2 A. Certainly.
3 Q. And you're saying the only motivation
4 you knew of in 1997 to do that was to avoid
5 corrosion?
6 A. That's not at all what I'm saying.
7 Q. Okay. What other reasons would someone
8 do that, someone of ordinary skill in the art?
9 A. In microelectronics, it is a common
10 occurrence that there needs to be a connection
11 between conductors of different layers, different
12 physical layers. And that's achieved most
13 commonly by making openings in that insulating
14 layer and providing some kind of electrical
15 connection, whether it's as depicted here or
16 perhaps by some other metal that's -- that's also
17 deposited.
18 Q. And why is that advantageous over just
19 putting layer 7 on top of layer 2?
20 A. Are you asking specifically to Sukegawa
21 or just in general?
22 Q. To the prior art -- prior art in
23 general?
24 A. In general?
25 Q. As of 1997?

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1 A. Well, again, there are many situations
2 where there's a circuit that has a metal wiring on
3 one layer and then an insulator and then another
4 metal. The kind of chips that we have nowadays
5 have, I think, half a dozen. It's very common.
6 And even my students prototype PC boards with
7 multi-layer wiring. That's not
8 semiconductor-based, but it's simply proto boards.
9 And in those cases, of course, they have
10 an insulator, they have different levels of
11 wiring, and they often make holes in the insulator
12 and make contact through them. It's a way to make
13 contact between metals that are in different
14 layers.
15 Q. But it doesn't have any other
16 advantages, it's just a way to make contact?
17 A. I wouldn't characterize it that way.
18 I'm saying that's -- that's what one of ordinary
19 skill would begin with. There may be advantages
20 to that beyond it. Sukegawa has one. There may
21 be more.
22 Q. And as of 1997, are you aware of what
23 those would be?
24 MR. SCHLITTER: Objection, form,
25 foundation.

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1 THE WITNESS: As I sit here now, I can't
2 speculate and list them all for you.
3 BY MR. GIBSON:
4 Q. Okay. Can you list any additional ones?
5 A. Any addition --
6 MR. SCHLITTER: Same objection.
7 BY MR. GIBSON:
8 Q. You've listed corrosion as being one or
9 resisting corrosion as being one.
10 Are there any others that you can
11 identify as of 1997?
12 MR. SCHLITTER: Object. I think this is
13 beyond the scope of his declaration.
14 MR. GIBSON: I don't agree.
15 THE WITNESS: I'm having a -- having a
16 hard time understanding your question. I know you
17 don't want me to speculate, but that's what it
18 sounds like you're asking me to do.
19 BY MR. GIBSON:
20 Q. Well, I don't want you to speculate.
21 I'm just asking if you can identify any other
22 advantages. You said there may be more. I'm just
23 wondering if you can identify any of those.
24 MR. SCHLITTER: Objection, scope.
25 THE WITNESS: At the moment, I can't

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1 think of any more.
2 BY MR. GIBSON:
3 Q. So if we look at Sukegawa again -- maybe
4 we'll look at 1B this time.
5 A. I've got it.
6 Q. And would you consider this to depict
7 multi-layer wiring, a multi-layer wiring
8 structure?
9 A. I would not and I think Sukegawa would
10 also not call it that.
11 Q. What type of structure would you call
12 it?
13 A. I think a person of ordinary skill at
14 the time of the '413 patent would call this a
15 structure that -- that has multiple wirings in it
16 and insulators. So if you're referring to
17 elements 2, 3, 7 and 8, then it's a four-layer
18 structure.
19 Q. With multiple wirings?
20 A. With multiple wirings.
21 Q. Would you consider those wires to be
22 deposited in a layer?
23 MR. SCHLITTER: Objection, form.
24 THE WITNESS: Which one in particular
25 or --

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1 BY MR. GIBSON:
2 Q. Well, let's take 2. Is that deposited
3 in a layer on the substrate?
4 A. Well, whether it's a layer, it does
5 depend on the context. The word "layer" can be
6 used in lots of different ways that can be
7 misleading. So, I mean, certainly layer 2 is
8 simply deposited or grown on the substrate 1. And
9 I think, at least in some contexts, that could be
10 called not only a wiring, but that could be a
11 layer.
12 Q. What about wiring 7, can that be
13 deposited on a layer?
14 A. Well, 7 is also a conductor that's
15 deposited in a single step and also then patterned
16 subsequently. I can imagine contexts where that
17 is by itself called a layer, but not this one,
18 because it's referred to here as a wiring.
19 Q. If it called it a layering, would that
20 change your view?
21 A. If there was a context where element 7
22 was called a layer?
23 Q. Yes.
24 A. I'm not sure.
25 MR. SCHLITTER: Objection, foundation.

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1 THE WITNESS: I'm not sure. It would
2 depend on that context.
3 BY MR. GIBSON:
4 Q. You would agree with me that there's a
5 deposit of wire 2 and then over that there's a
6 deposit of an insulating film 3?
7 A. Yes, that's certainly what's in Fig. 1B.
8 Q. And then there's an etching step that
9 creates holes in layer 3?
10 A. Yes, they're -- I think a person of
11 ordinary skill would expect that, even if it's not
12 explicitly talked about.
13 Q. And then layer 7 or wiring 7 is
14 deposited?
15 A. That's correct.
16 Q. And it fills in the holes that we have
17 in layer 3?
18 A. I don't think it's illustrated as
19 filling in the holes, but clearly it's going into
20 the holes. It's going through the openings to
21 make the contact in -- with layer 2 through the
22 openings in layer 3.
23 Q. All right. So there's -- and there's
24 electrical contact between layers -- or wire 7 and
25 wire 2 as a result of the holes in layer 3?

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1 A. Yes, that's right.
2 Q. And 6 is depicting one of those holes?
3 A. Well, 6 is pointing to one of those
4 holes. I'm not sure if it's specifically the
5 opening in 3 or not. I'd have to check the spec,
6 but it is pointing to the vicinity of one of the
7 openings. Element 6 is the contact hole in
8 layer 3. They're also called through holes.
9 Q. Looking again at 2C --
10 A. I've got it.
11 Q. -- you would agree that that 9 is an
12 insulation layer?
13 A. 9 is an insulating layer.
14 Q. And it's extending over 8 and 7?
15 A. In Fig. 2C, it is partially over
16 elements 8 and 7, yes.
17 Q. Do you know what it's made of,
18 element 9?
19 A. The specification for Sukegawa mentions
20 that it can be made of silicon nitride.
21 Q. And you would agree that's an insulating
22 layer?
23 A. Yes, I would.
24 Q. Would you also agree that can provide
25 protection from the environment and from

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1 corrosion?
2 A. I agree that that's what Sukegawa says
3 and I have no reason to disagree with that.
4 Q. Would you agree that it's used
5 extensively in the microelectronics industry as a
6 final passivation or protection layer?
7 A. Yes, it's very common.
8 Q. And if you look at -- let's look at
9 Fig. 3C.
10 A. I see it.
11 Q. And focusing on the right side of
12 Fig. 3C, do you see layer 9?
13 A. I do see it.
14 Q. And would you agree that it's going to
15 be present to the right of the arrow labeled "for
16 terminal portion"?
17 A. Well, there's two "for terminal portion"
18 labels, one to the right and one to the left.
19 Q. I'm talking about the one to the right.
20 A. And the one on the left does not have
21 layer 9 on it, of course, but the one on the right
22 does. So I would understand it, at least on the
23 right side, to extend -- what's implied here is
24 that it extends all the way to the terminal
25 portion.

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1 Q. And if we look back at Fig. 1B --
2 A. I've got it.
3 Q. -- do you see that there's layer 9 on
4 the left?
5 A. I do.
6 Q. And it's going to be extending to the
7 display portion, is that correct?
8 A. I do see what Fig. 1B says about that,
9 sure. Element 9 is there. It's on the left side
10 of Fig. 1B and I think what's implied is that it
11 would extend to the left toward the display
12 portion.
13 Q. Without interruption?
14 A. I can't say.
15 Q. Is there anything that tells you it
16 would be interrupted somewhere along that path?
17 A. Well, the one thing that tells me that,
18 at least occasionally in Sukegawa's mind,
19 element 9 does get interrupted is Fig. 3C where
20 it's interrupted on the left side of that figure
21 and I can't say.
22 Q. I'm not talking about the left side,
23 though. I'm talking about Fig. 3C from the right
24 extending to Fig. 1B of the left.
25 Is there anything that tells you that 9

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1 would be interrupted in that area?
2 A. There's nothing to suggest that it is
3 interrupted, but there certainly is nothing saying
4 that it's not.
5 Q. Do you agree that the insulating layer 9
6 is the top layer between the display portion and
7 the terminal portion?
8 A. Again, if we go back to Fig. 3C, that
9 seems to be true on the right side, but it's
10 clearly not true on the left side.
11 Q. I'm talking about from the right of 3C
12 to the left of 1B, would you agree that layer 9 is
13 shown to be -- is shown to be the top layer
14 between the display portion and the terminal
15 portion?
16 A. Well, I thought I just answered that.
17 So Fig. 3C has two terminal portions, right?
18 There's one on the left side and one on the right
19 side. I believe one of ordinary skill would see
20 Fig. 1B or terminal figures in Sukegawa as
21 representing either side of the display. It
22 depends on how it's put into the display.
23 And so I think Fig. 1B can be seen on
24 both sides of Fig. 3C as -- as one option. So
25 Fig. 3C clearly says that there are terminals on

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1 either side of it and on the right side, layer 9
2 does appear to extend from that side to the
3 terminal portion. But on the left side, it
4 clearly cannot.
5 Q. Okay. But I'm focusing on the right
6 side.
7 And on the right side, would you agree
8 with me that it's the uppermost layer over the
9 display and the terminal portion?
10 A. On the right side, it is likely that 9
11 does extend from this TFT to the terminal portion,
12 but not on the left side.
13 Q. Now, if you look at Fig. 3C, you see
14 wiring 7A?
15 A. I do.
16 Q. Would you agree that's the data signal
17 wiring that extends toward the terminal portion?
18 A. Yes, 7A is the data signal wiring. It's
19 not shown in Fig. 3C where it goes, but it
20 certainly goes off this illustration and toward
21 the terminal portion. But to be clear, of course,
22 it cannot simply extend out to the illustrations
23 for the terminal in any of the other figures
24 because it's not connected. It's expressly shown
25 as not being connected.

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1 Q. Well, let me get to my question. And
2 I'll move to strike the last sentence and just not
3 being responsive.
4 Will the -- you would agree that where
5 you see 7A, it is going to be under insulating
6 layer 9?
7 MR. SCHLITTER: Objection, form.
8 THE WITNESS: The only time layer 7A is
9 illustrated, as far as I can tell, is in Fig. 3C.
10 And clearly, it's under element 9 in that figure.
11 BY MR. GIBSON:
12 Q. And do you see any indication that 7A
13 would not be under element 9?
14 A. It's -- it's not clear to me that it
15 would be either way. I can't tell either way.
16 Q. And would you -- well, there's nothing
17 that ever shows that 7A is above layer 9, correct?
18 A. There's nothing that shows that, no.
19 Q. Okay. Is there anything that ever shows
20 7A exposed without a layer 9?
21 A. Well, the whole terminal portion, yeah.
22 Q. What are you referring to?
23 A. Well, for example, we were talking about
24 Fig. 1B, but this is true of many of the examples.
25 In Fig. 1B, there's an opening created in the

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1 terminal portion in layer 9 and in layer 9, or
2 underneath that opening is wiring 7 as well as
3 other things, and there is no insulating film 9
4 above that.
5 Q. I'm referring specifically to 7A,
6 element 7A.
7 Do you ever see a situation where 7A is
8 exposed in an opening of 9?
9 A. There is no explicit disclosure of that
10 situation in Sukegawa.
11 Q. Is there any implicit disclosure?
12 A. Only to the extent that Fig. 3C shows an
13 example where layer 9 ends and conductors
14 continue.
15 Q. Well, that doesn't have a 7A?
16 A. Well, it may not have a 7A, but it has
17 an 8A. I'm looking to see what 8A is called. In
18 this case, it's a conductor. It's the pixel
19 electrode.
20 Q. Now, would you agree that the sealant is
21 going to be somewhere in between the terminal
22 portion and the display portion?
23 A. It should be.
24 Q. And regardless of the exact location of
25 where that sealant is, will it be in direct

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1 contact with layer 9?
2 MR. SCHLITTER: Objection, foundation.
3 THE WITNESS: It's not disclosed in
4 Sukegawa, but I can agree that a person of
5 ordinary skill would anticipate that that's so.
6 BY MR. GIBSON:
7 Q. Now, in a liquid crystal display, would
8 you agree that there are two sets of lines that
9 run orthogonal to each other?
10 A. In the vast majority of displays that
11 are sold, that's the case, yes.
12 Q. And one of those -- one set of the lines
13 is for scan lines and one set is for signal or
14 data lines?
15 A. That's generally the case, and it's the
16 case in all of the patents I think we're looking
17 at.
18 Q. And, for example, in the '413 patent, if
19 you look at Fig. 13, that illustrates prior art
20 showing signal and data lines that are orthogonal
21 to each other?
22 A. It's not clear to me that that's shown
23 in Fig. 13, but I think it is true in Fig. 13.
24 Q. Are those lines shown to extend outside
25 the display portion at the bottom and right-hand

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1 side?
2 MR. SCHLITTER: Objection, form.
3 THE WITNESS: On the bottom and
4 right-hand side are the short rings, as they're
5 called, and these are helpful in manufacturing to
6 minimize the static buildup that occurs during
7 fabrication. So those are wirings. Those are
8 conductors.
9 BY MR. GIBSON:
10 Q. But sure not sure whether those are data
11 lines or scan lines?
12 A. I would hesitate to call them data lines
13 and scan lines simply. I think they're something
14 more. They may be formed in the same metal
15 deposition process, but they are something
16 distinct, something different.
17 Q. Do they -- in addition to perhaps doing
18 other things, do they serve the purpose of scan
19 lines and data lines?
20 A. Certainly not external to the sealant,
21 no.
22 Q. Would you agree that the lines are
23 extending outside the display portion at the
24 bottom and right-hand side?
25 A. Those short rings 1509 do extend outside

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1 the sealant.
2 Q. Do you know if Sukegawa discloses
3 internal drivers or integrated drivers?
4 A. As best as I recall at the moment,
5 Sukegawa does not, but if you want a definitive
6 answer, I'd have to review Sukegawa to be sure.
7 Q. Why don't you take a moment and look at
8 it?
9 A. In Sukegawa, the driver circuit is
10 identified in Column 1, Column 2 and it's
11 consistently identified as being outside the
12 display. I can't find any mention of a peripheral
13 driving circuit.
14 Q. And where would you see those in the
15 figures? Where would you expect them to be?
16 A. Expect what?
17 Q. The external drivers.
18 A. Which figure?
19 Q. I'm asking you if you see a figure that
20 depicts those or where they would be connected.
21 A. Fig. 3D I think comes closest, although
22 they're not shown as far as I can tell. Fig. 3D
23 shows, of course, the two substrates on the left
24 side 100 and 200. There's the anisotropic
25 conducting film 10 that connects the flexible

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1 printed circuit 31 to the display. And then to
2 the right, this structure 32, 33, 300, all of
3 that, that goes then eventually to the right side
4 to connect to the drivers.
5 Q. All right. So you would agree that
6 there -- there have to be some external display
7 drivers in Fig. 3D?
8 A. I don't agree that there would have to
9 be. There would certainly need to be something
10 that this flexible printed circuit connects to.
11 Sukegawa I don't think refers to internal
12 peripheral circuits inside the display explicitly,
13 but I don't think there's any disclosure against
14 that or away from that.
15 Q. Okay. But one possibility that you
16 would see from Fig. 3D or the person of ordinary
17 skill in the art would see in 1997 was a possible
18 use in Fig. 3D of external drivers?
19 A. I think a person of ordinary skill would
20 read the disclosure in Sukegawa and understand
21 that the drivers in his examples are external to
22 the display on the right side of Fig. D, not
23 shown.
24 Q. And how many types of external drivers
25 would there be?

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1 MR. SCHLITTER: Objection, foundation.
2 THE WITNESS: Can you tell me what you
3 mean by "types"?
4 BY MR. GIBSON:
5 Q. Yeah. What kind of lines?
6 MR. SCHLITTER: Same objection.
7 THE WITNESS: Can you tell me what you
8 mean by "lines"?
9 BY MR. GIBSON:
10 Q. Well, there are scan lines, data lines.
11 A. Do you want me to characterize all
12 driver circuits?
13 Q. No, just in reference to Fig. 3D, what
14 would you expect that someone of ordinary skill in
15 the art looking at Fig. 3D would assume that there
16 would be in terms of external drivers?
17 A. Well, I think Fig. 3D is silent on what
18 kind of driver or purpose is -- is connected to
19 this FPC. So, for example, yes, scan line drivers
20 could be connected. Data line drivers could be
21 connected.
22 But another important example is the
23 ground and voltage lines could be -- reference
24 voltages could be connected in this way as well.
25 It's a -- it's a generic connection, a generic

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1 terminal that could be applied to any electrical
2 connection that's desired to the active matrix
3 substrate.
4 Q. Would you consider, if you look at -- if
5 we look at element 31, would you consider that to
6 be a flexible wiring substrate?
7 A. Flexible wiring substrate is what
8 Sukegawa calls 31.
9 Q. And element 32 is a driver IC?
10 A. That may be. Do you have the column
11 that that is in in Sukegawa?
12 MR. GIBSON: Why don't we go ahead and
13 change the media here and I'll try to help find
14 that for you.
15 VIDEOGRAPHER: We're going off the
16 record. This is the end of Media Unit Number 5.
17 The time is 6:15.
18 (Short recess.)
19 VIDEOGRAPHER: We're back on record.
20 This is the beginning of Media Unit Number 6 in
21 the deposition of Dr. Michael Escuti and the time
22 is 6:24. Please continue.
23 BY MR. GIBSON:
24 Q. Column 5, I think, at line 39 describes
25 the element 32 as a driver IC.

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1 A. Now that I've reviewed that column, I
2 can see that some of my comments were not informed
3 by that -- those elements about Fig. 3D. So I
4 could revise them if you'd like. But yes, I can
5 see that element 32 is the driver IC in this
6 example.
7 Q. And how does that inform your testimony?
8 A. Well, it's principally to point out that
9 Fig. 3D does show in element 32 the driver IC.
10 It's actually shown. I think I had said it was
11 off to the right side, so that's incorrect.
12 But this is, nevertheless, still just
13 one example of a connection to the terminal that
14 is disclosed in 3B, 3C, 3E, et cetera. And there
15 would be many other configurations that I think
16 would be fair variations to one of ordinary skill
17 in light of Sukegawa.
18 Q. Okay. Would you understand that there
19 would be a scan line driver and a data or signal
20 line driver in Fig. 3D?
21 A. Fig. 3D refers to a driver IC dye. I
22 don't think it specifies whether that is the scan
23 or the data driver. I think he's implying it
24 could be either or something else.
25 Q. Do you know what the role of the driver

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1 is?
2 MR. SCHLITTER: Objection, form.
3 BY MR. GIBSON:
4 Q. What's it used for?
5 A. It's typically used to convert signals
6 in some way from what's external to the display to
7 the format that's needed by at least this portion
8 of the active matrix substrate. It may transform
9 voltages. It could split wirings. It could
10 change frequencies. It could have a lot of
11 functions.
12 Q. Okay. If you consider an LCD display
13 driver IC in which the terminal portions are shown
14 in Fig. 2C of Sukegawa, can you tell if Fig. 2C
15 depicts a terminal portion for a scan line or a
16 signal line?
17 A. Fig. 2C shows a terminal portion where
18 the only conductor that extends toward the display
19 is wiring 2. And wiring 2 in Fig. 3C at least is
20 identified only as -- to the extent that there's
21 2A, which is not the same, but it's the gate of
22 that TFT. So that would be -- it would be
23 consistent to see that as showing a scan line.
24 Certainly it's not limited to that, but
25 that's one example where the TFT is a bottom gate

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1 TFT. The inverse would be true if it was a top
2 gate TFT.
3 Q. Then it would show a data line?
4 A. In that case it would show a data line,
5 yeah.
6 Q. So would you agree though that Fig. 2C
7 is showing a scan line terminal?
8 A. Well, I can't say that definitively
9 because, of course, Fig. 2C is prior art. It's
10 not his invention. In Sukegawa, Fig. 3 is the
11 beginning of the series of embodiments and it's
12 not clear that Sukegawa definitely wants to say
13 that element 2 in Fig. 2C is the same as what's in
14 Fig. 3C. I think it's consistent with the
15 disclosure, but I don't think he requires it.
16 Q. Okay. So but I think what you said
17 before is that you're going to have -- say in 3C
18 we have a -- here we have a data line with 7A?
19 A. Yes.
20 Q. That's going to be extending, is that
21 correct?
22 A. It does seem to be extending off to the
23 right of Fig. 3C.
24 Q. And would you then expect there to be a
25 driver for that data line that would be off to the

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1 right in the terminal portion?
2 A. Well, it's -- it's not disclosed
3 clearly, but I think one of ordinary skill would
4 expect that wiring 7A does eventually connect
5 through perhaps other conductors to a driver IC of
6 some kind.
7 Q. And this would be the reverse TFT that
8 we were talking about in 2C?
9 A. I'm not sure what you mean, "the reverse
10 TFT."
11 Q. Let's not -- I think you said it better
12 earlier. That you would have a display TFT if we
13 were talking about line 2 and you're going to have
14 a TFT that's driving the data line if we have
15 line 7A?
16 MR. SCHLITTER: Objection, form.
17 THE WITNESS: I'm afraid I don't know
18 what a display TFT is.
19 BY MR. GIBSON:
20 Q. Okay. That was not -- that's not what I
21 meant.
22 I guess if you look at Fig. 3C and
23 Fig. 1B --
24 A. I see them.
25 Q. -- and you consider a terminal for the

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1 signal line 7A, that terminal line is not going to
2 look like Fig. 1B, correct?
3 A. Well, if we try to combine Fig. 1B, the
4 prior art that's cited, and Fig. 3C, then this
5 terminal would -- would not necessarily lead to a
6 connection with 7A unless something else was in
7 between changing the electrical connection from
8 the layer 2 up toward layer 7A.
9 Q. And would you understand that a figure
10 such as 1B could be modified so that it would
11 function with 3C so that you would have line 7
12 extending into the terminal portion?
13 A. I don't think the disclosure supports
14 that. I think what's explicitly disclosed is
15 that 2 goes in, and I think what a person of
16 ordinary skill would more likely see is that
17 there's a later opening to the left of what's
18 illustrated in Fig. 1B that has a similar
19 connection through that opening of the layer 7
20 down to layer 2. I think that's what's much more
21 obvious to a person of ordinary skill.
22 Q. And that would be so you could have a
23 connection between 7 and 7A?
24 A. Via layer 2.
25 MR. GIBSON: Okay. And I assume we have

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1 the same understanding I had with you on these two
2 depositions, that we can use the transcript in
3 either of the two proceedings since there is so
4 much overlap and that I'll endeavor not to repeat
5 myself tomorrow, though I might not be perfect at
6 that.
7 MR. SCHLITTER: I think that would be
8 fine as long as -- you know, with that
9 understanding that we won't plow the same ground
10 again.
11 MR. GIBSON: No, I'm going to do my best
12 not to. I mean, there may be -- there may be some
13 overlap just because of the nature of the way
14 these things are. But with that, I am done for
15 the day, although I'll reserve the right to ask
16 questions after you do.
17 MR. SCHLITTER: I just have one topic.
18 EXAMINATION
19 BY MR. SCHLITTER:
20 Q. I wanted to refer to Exhibit 1011.
21 A. Did you say 1011?
22 Q. Yes.
23 A. I don't seem to have that. What does it
24 look like?
25 MR. GIBSON: Too much paper.

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1 THE WITNESS: Yes.
 2 Ah, finally.
 3 BY MR. SCHLITTER:
 4 Q. Okay. Exhibit 1011 is from page 94 of
 5 your declaration in the '413 case?
 6 A. Yes, it is.
 7 Q. And you mentioned that -- on your direct
 8 testimony or your cross testimony that the
 9 capacitor line Cj and the scanning lines Yj would
 10 be the first thing that would be formed as shown
 11 in this figure, correct?
 12 A. Yes, that's correct.
 13 Q. And the second thing that would be
 14 formed would be gate dielectric 211?
 15 A. That's correct.
 16 Q. Do you see the two white rectangles
 17 overlying the scanning line, vertically above the
 18 scanning lines Yj?
 19 A. I do.
 20 Q. What are those?
 21 A. Those are the semiconducting layers that
 22 form the channel of the TFT.
 23 Q. What is the difference between the
 24 smaller rectangle on the top and the larger
 25 rectangle on the bottom, the white rectangles I'm

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1 referring to?
 2 A. It's a particular design of the TFT
 3 which has different amounts of doping in -- in
 4 those two regions. And the purpose of that
 5 relates to the etch that has to happen in that
 6 region above that. And this structure is a
 7 well-known design to ensure careful etching of
 8 that back channel.
 9 Q. When would those semiconductor layers be
 10 deposited?
 11 A. Well, they would need to be deposited
 12 before the source electrodes, obviously, because
 13 those overlie them. In this figure, it's not
 14 required whether they're formed below -- before
 15 the ITO or after the ITO, but I -- so that's not
 16 clear from the figure.
 17 MR. SCHLITTER: Okay. I have nothing
 18 further.
 19 MR. GIBSON: I don't have anything
 20 additional.
 21 VIDEOGRAPHER: This concludes the
 22 videotaped deposition of Dr. Michael Escuti. The
 23 time is 6:37. We're now off record.
 24 (Whereupon, the deposition concluded
 25 at 6:37 p.m.)

Page 276

1 UNITED STATES PATENT AND TRADEMARK OFFICE
 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
 3
 4 INNOLUX CORPORATION,)
 5)
 6) Petitioner,)
 7)
 8 vs.) IPR2013-00066
 9)
 10) U.S. Pat. No.
 11 SEMICONDUCTOR ENERGY) 7,876,413
 12 LABORATORY CO., LTD.,)
 13)
 14 Patent Owner.)
 15
 16 I, MICHAEL J. ESCUTI, Ph.D., being first
 17 duly sworn, on oath say that I am the deponent in
 18 the aforesaid deposition taken on September 5th,
 19 2013; that I have read the foregoing transcript of
 20 my deposition, consisting of pages 1 through 278
 21 inclusive, and affix my signature to same.
 22
 23 _____ as it now appears
 24 _____ as it now appears with corrections
 25
 26 MICHAEL J. ESCUTI, Ph.D.
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1 signature not being obtained;
2 That I am not counsel for nor related to
3 any of the parties herein, nor a relative or
4 employee of such attorney or counsel for any of
5 the parties hereto, nor am I interested directly
6 or indirectly in the outcome hereof.

7 IN WITNESS WHEREOF, I have hereunto set
8 my hand and seal of office this day of
9 , 2013.

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SANDRA L. ROCCA, CSR, RPR, RMR, CRR
CSR License No. 084-003435
Expires May 31, 2015

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|---|--|---|--|
| <p>2012 4:15 29:10,12 2013 1:17 4:16 5:2 116:3 276:13,22 277:5 278:9 2014 4:18 2015 4:19 117:3 278:13 2016 4:20 118:20 2017 4:21 122:18 2018 4:22 123:11 2019 4:23 124:18 2020 4:24 116:3 2021 126:4 204 3:23 4:5 10:8,19 130:23 150:22 176:13 180:6 183:21 228:6,18 21 126:12 211 133:10 136:11 136:24 138:6 149:24 184:14 230:2 238:15 241:12 274:14 220 4:12 2200 2:14 227 4:13 23 156:25 164:20 231 137:19 144:4 149:25 238:17,25 240:19 241:3 241 132:10 138:5,24 139:7 140:24 144:5 145:6 146:11 150:1 184:11 228:25 230:19 239:1 25 170:22 251 132:3 150:2 239:7,8 240:18 241:11 26 156:25 271 239:2 273 3:5 278 276:14 29 4:15 45:17</p> | <p>2a 191:22 269:21 2b 188:15 191:22 247:22 248:10 2c 4:14 69:18,23 70:23 162:13 168:22 172:17,21 173:10 174:2 180:11,14,24 181:13 184:21 185:15 186:8 189:1 190:12 191:9,23 194:6,16 198:13 200:7 203:15 204:17 205:11 248:10 255:9,15 269:14,14,17 270:6 270:9,13 271:8</p> <p style="text-align: center;">3</p> <p>3 2:3 29:19 40:4 87:3 114:3 156:25 164:11 168:10,10 169:7,9,15,19 182:20 189:2,6 192:5 194:10 225:2 225:8 227:10,12 247:3 252:17 254:6 254:9,17,22,25 255:5,8 270:10</p> <p>3.5 87:18 30 48:3 277:19,22 300 265:2 31 3:13 204:4,9 205:16 265:1 267:5 267:8 278:13 312 2:10,10,15,15 31b 204:10 32 265:2 267:9,25 268:5,9 33 3:15 46:1 265:2 34 3:16 35 3:18 37 3:19 39 192:18 267:24</p> | <p>3:05 164:12 3:21 164:17 3a 90:20 3b 90:20 173:10 268:14 3c 90:17 256:9,12 257:19,23 258:8,11 258:17,24,25 259:13,19 260:9 261:12 268:14 269:19 270:14,17 270:23 271:22 272:4,11 3d 67:9 172:23,23 173:2,6 264:21,22 265:7,16,18 266:13 266:15,17 268:3,9 268:20,21 3e 90:21 173:10 268:14 3m 12:8 13:10,11</p> <p style="text-align: center;">4</p> <p>4 3:20,23 4:4,6,23 4:25 38:21 39:2,12 40:6,6 101:21 129:18,24 130:4 131:7 135:5 147:10 147:14 164:15 208:9 209:20 229:8 229:11 230:11 242:18 40 139:7 401 207:10 242:2,18 243:1 244:4 403 153:18 241:19 242:2,18 243:1 244:4 41 138:21 413 3:21 7:16 8:18 8:24 9:9 10:8,19 48:5 56:5 58:8,23 59:25 60:14 61:11 64:3,10 112:5 115:13,15,19</p> | <p>150:22,25 151:11 153:3 156:2 157:20 161:8,11 165:19 169:2 173:19,21 174:11 175:19 176:13 180:6 183:20 187:18 192:22,24 193:8 194:4 195:11,11,20 196:1 197:3 200:23 201:18 202:23 204:7 205:4,5,20 206:3,11,12 207:20 208:16 212:4 228:17 236:7 241:21,22 242:4,25 245:13 252:14 262:18 274:5 48 67:21,22 68:3 69:8,19 49 3:23 130:6 4:37 209:21 4:49 210:1 4a 152:6,15,25 153:16,17,17 155:3 155:24 156:1 164:22 202:18,23 206:12,18 207:10 207:16 212:7,15,16 213:9,19 214:1,11 214:17,23,25 215:5 216:2,15,22 217:6 217:23 218:1 241:20,22 243:25</p> <p style="text-align: center;">5</p> <p>5 3:4 96:9,12,13 97:4,5,9,14 98:3,4 98:25 99:15,19 100:18 101:4,16,24 102:12,16,23 103:2 103:10,15,16,18 104:2,11,14 105:1 105:23 106:24 107:18,21,24</p> |
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