SEL EXHIBIT NO. 2017

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

IPR2013-00068

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

INNOLUX CORPORATION,	)	
	)	
Petitioner,	)	
	)	
vs.	)	IPR2013-00066
	)	U.S. Pat. No.
SEMICONDUCTOR ENERGY	)	7,876,413
LABORATORY CO., LTD.,	)	
	)	
Patent Owner.	)	

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

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Also Present:
Ms. Mary Ann Naas, Videographer

INDEX

EXHIBITS

(continued)

EXHIBITS

VIDEOGRAPHER: My name is Mary Ann Naas of Veritext. Today's date is September 5th, 2013. The time is approximately 9:39.

This deposition is being held in the office of Steptoe & Johnson located at 115 South LaSalle Street, Chicago, Illinois.

The caption of the case is Innolux Corp. versus Patent of Semiconductor Energy Lab in the United States Patent and Trademark Office. The name of the witness is Dr. Michael Escuti.

At this time will the attorneys please identify themselves, after which our court reporter, Sandra Rocca of Veritext, will swear in the witness and we can proceed.

MR. GIBSON: Stan Gibson on behalf of the Petitioner.

MR. SCHLITTER: Stan Schlitter of Steptoe & Johnson and Edward Manzo of Husch Blackwell on behalf of the patent owner.

MICHAEL J. ESCUTI, Ph.D.,
having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. GIBSON:

Q. Good morning. Could you state your name

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

make any changes or corrections, we can comment on your credibility as it pertains to those changes or corrections.
Do you understand that?
A. I do understand that.
Q. Any reason why your deposition cannot proceed today?
A. There is no reason.
Q. When were you first contacted in this matter?
A. As best as I can recall, it was in April.
Q. Of this year?
A. Of this year, yeah.
Q. And what were you asked to do?
A. At first I was asked to review the '413 patent that we're talking about today and join a meeting with the attorneys here and discuss my understanding of the patent and the possibility of my joining the IPR in support of this patent.
Q. And I take it you then accepted the assignment?
A. I did.
Q. And what did you understand that your assignment was to do in this case or in this

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

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

was evidence enough for my position on that, so that I didn't turn to those. I didn't need to turn to those because they were cumulative.

Q. Do you recall what you reviewed in that regard, the ones that you didn't need to turn to?

A. I don't recall.

Q. Did you review any other patents that are owned by SEL other than the '204 and the '413?

A. In this matter, I did not review any other patents. Of course, I can't recall if sometime in my career I've reviewed patents that are assigned to SEL. I don't recall.

Q. But doing this assignment, you don't remember reviewing any other SEL patents?

A. That's correct. In this assignment, I didn't review any other patents owned by this patent owner.

Q. Are you familiar with any other patents owned by SEL, other than '204 and '413, as you sit here today?

A. I'm not familiar with any other patents that are involved in any litigation that SEL -- SEL has.

Q. Well, apart from litigation, are you aware of any at all?

A. No, I'm not.

Q. Let's talk a little bit about your educational background.

If you can tell me where you graduated from college and what year?

A. I graduated with my Bachelor's of Science in electrical and computer engineering in 1997 at Drexel University. I then went on to graduate school and earned two degrees, first a Master's and then a Ph.D., where the final year for the Ph.D. was 2002 and that was at Brown University, also in electrical engineering.

Q. And the Master's, is that also at Brown?

A. It was.

Q. And do you remember what year that was?

A. It's in my CV specifically, of course, but as best as I can remember, it was 1999.

Q. And were you working in industry at all from 1997 to 2002?

A. I consulted with industry as a consultant, but I was not employed or working during that time because I was a graduate student. So I had consulting outside of my academic responsibilities and, in addition, I was supported in part by industrial funding in the context of

the university research.

Q. And who were you consulting for?

A. There were three firms that I can specifically remember. One was Cabot. Another was a small firm that was -- to be honest, I don't remember their name. They were a very small firm and local to Providence, Rhode Island. And then -- then lastly, there was some consulting to 3M, of course at St. Paul, Minnesota.

Q. And what type of consulting work were you doing for Cabot?

A. The consulting work was to advise them on their questions for using a particular kind of material that they had and had certain material properties and they were looking for opportunities to use it and market it -- well, to use it in an application that could lead to new business for them.

Q. And for the small firm?

A. For the small firm, it was a -- it was actually to help them create a toy. It was quite fun. They were -- they were a firm, more of -- more of a design firm, and they wanted to create skateboarding/rollerblading glove that would have a circuit inside it so that a child could press a

button and then have it make a noise and make a song or make various things happen. So it was an integrated circuit that I was designing and prototyping for them.

Q. Do you know if that was ever commercialized?

A. It was a very small outfit and I think that project was -- came to a prototype and then didn't find any future funding.

Q. And then what were you doing for 3M?

A. For 3M, my principal role was to lead short courses, a series of short courses that was on the subject of LCDs and displays more generally. It went beyond LCDs.

So this was in conjunction with my Ph.D. advisor where we were both creating the short course and presenting it to them in their facility to technical folks of all kinds.

Q. And when did you first start either studying or working with LCDs?

A. I first became aware of the principles of LCDs and TFTs during my Bachelor's degree training, so that would be before 1997. During graduate school is when I first began building them and making them myself in the lab, and that

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

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

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

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

both from the chemistry -- I'm not a chemist, but I was working with chemical engineers. We also looked for ways, using other principals, to control the molecules themselves to improve performance, whether it was light extraction or mobility enhancement. There were many things that we were looking at.

Q. Anything else that you can recall in that two-year period?

A. Right now I can't specifically remember anything else.

Q. All right. And then you became an assistant professor at NC State?

A. Following my post-doc, I began my position at NC State in 2004 as an assistant professor.

Q. And what types of courses were you teaching in that or have you taught in that six-year period?

A. The six-year period being when I was an assistant professor?

Q. Yes.

A. Well, in my role as assistant professor, of course I both teach and research and the teaching involved -- one course that I taught was

the -- was an introductory circuits course that involves a lab as well and it's required by all our students in the department to take. So that's "Circuits, Signals and Systems."

Another course that I taught during that time, actually created, was a course on LCDs and organic electronics, and that course in particular had support from the National Science Foundation for me to develop the lab portion of that course.

And so in that course, students -- that I created with one of my graduate students, we would guide our students to actually make the elements we were studying. So they made a simple LCD, they made an organic TFT, they made an organic solar cell and an organic LED, and then they tested it and evaluated it. So that's another course that I taught.

There's a third course I taught that -- I think it's at least approximately titled "Introduction to Photonics and Optical Communications."

Q. Okay. And in terms of research, what were you doing while you were an assistant professor?

A. As an assistant professor, I studied --

well, my focus has always been on the interaction of light and matter and so it's this field of optoelectronics, sometimes it's called photonics. And many of the applications that I look at involve displays, not exclusively, but involve displays, but also telecom, energy harvesting sensors, camera systems, optical recording.

And so my interest is to study and innovate in the material side and the architecture of a system for a particular application. So one example of that is related to LCDs that has continued even now is the design of projectors and LC -- direct-view LCDs which have improved energy efficiency compared to our standard technology.

Q. Anything else you were researching in that time period?

A. Yes. During that time period, I advised I think five Ph.D. students, four or five. We studied topics that relate to nonmechanical beam steering. We studied topics that have to do with optical filtering. We studied topics that have to do with optofluidics, which -- which is this field where particles or cells are within a fluid and there are optical means to control them, to move them, to grab them, to analyze them. So that was

still another -- another side.

And in my research, we also investigated optical TF -- I'm sorry -- organic TFTs and enhancements that we can offer using the other principles that we have for improved performance.

Q. Anything else that you can recall in that six-year time period, from 2004 to 2010, in terms of research?

A. At the moment, I can't recall anything further.

Q. All right. Then in 2010 you became an associate professor at NC State?

A. I did.

Q. And did your courses change or did they stay the same?

A. My courses around that time changed. I began teaching a new course on electromagnetics and it's also required by all students in my department. It's an undergraduate course and that includes transmission lines and circuits inside it, as well as the more general principles of classical electromagnetics.

Q. Any other courses that changed?

A. Yes, there's one other one which began this semester and it's the first time I'm teaching

it. It's also the first time it's being taught anywhere in the university. And this course is "Introduction to Nanoscience and Nanotechnology."

So this has an emphasis on, of course, nanotechnology and its applications in -- across many fields, including nanoelectronics, nanomaterials, biotechnology, among many others.

Q. And what about your research? Is there anything different since 2010 in your research?

A. In my academic research, I think largely I've continued the general directions that I laid out. I certainly have a different emphasis now. Some are more -- I'm spending much more time on than others, but it's largely in the same directions.

Q. What are you spending much more time on?

A. Well, the two project directions that are more and more important, one of them is displays and display systems where we have technologies that solve energy problems or complexity problems within display systems. So that's one.

Another is in telecom. So we are able to make elements that have great benefits to the telecom industry. So we have an emphasis on

studying that and providing prototypes for industry. It's industry-sponsored, in fact. Both of these are industry-sponsored.

Q. When you say "telecom," can you be a little more specific?

A. Well, this may not be as specific as you're asking, but it's hardware that would support an optical fiber system, for example, supporting the internet.

A third project that's taking much of our attention is in the direction of making optical films for astronomers and so there's several astronomers that we've been working for that study -- they're called exoplanets and solar systems that have planets around them and so we, in partnership with them, create elements that help them do that.

Q. Apart from ImagineOptix, which we'll get into in a moment, have you done -- and apart from what you've just discussed -- have you done any other work for industry while you've been at NC State?

A. I think it's the case that all of my work while I've been at NC State with industry, outside of ImagineOptix, has been through the

university, through sponsored programs that industry would pay the university to sponsor research in my lab.

Q. And that's the kind of research you were just discussing?

A. Yes.

Q. And ImagineOptix, how did that get started?

A. ImagineOptix started in -- actually, right as I joined NC State, I encountered two of my co-founders. They are father and son, so they have the same last name and confusingly, they have the same first name, but they have different middle names.

So I met them and we founded the company with -- where it was clear that they saw an opportunity to build pico projectors, small projectors that could be integrated into other devices including cell phones, but also other things like camcorders and it -- as we -- as we talked, we realized that my technology that I was already studying for my post-doc and had plans to pursue at NC State, would be a very good solution for that. So we joined together.

I became, you know, a majority

shareholder of the company and we then proceeded from there. And that's really where it started. It continued then to seek funding from -- from any means that we could to establish the company and pay for the intellectual property costs, for example.

Q. And when you said your technology would be a great fit for what they were doing, what were you referring to in terms of your technology?

A. Well, the technology that we had been studying and continue to study today, offers a dramatic improvement to the energy efficiency of a display system when configured in the ways that we were pursuing. And so that means that, for example, your cell phone display or your projector could have twice the efficiency that it would otherwise without our technology using standard methods and, of course, that means that your cell phone would last twice as long roughly, or a projector could be twice as bright, still using all the same power or other technology.

So that's the basis of the technology, but that can be applied in many ways and there were at least two ways that we applied it. One way was to integrate it into the liquid crystal

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

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

Q. Is the technology focused on the optical layer?

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

Q. You mentioned --

A. It's not --

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

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

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

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

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

Q. Anything else in change in the TFT layer?

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

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

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

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

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

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

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

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

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

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

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

BY MR. GIBSON:

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

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

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

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

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

Q. Are there updates since then?

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

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

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

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

biography, list of education, kind of a mini -- mini resume, certainly not complete and not updated recently now that I'm looking at it.

Q. And would you consider this to be accurate?

A. As far as I'm aware, everything that's here is accurate, but it's certainly not comprehensive and the audience -- I mean, the purpose of this is simply to inform students of who I am and has a very different purpose than being -- I guess being a full, real resume.

Q. But there's nothing inaccurate about it?

A. Not that I'm aware of.

MR. GIBSON: If we could mark this as 1008.

(Document marked as Exhibit Number 1008 for identification.)

BY MR. GIBSON:

Q. And do you recognize Exhibit 1008?

A. It's a little hard to say because I think this page doesn't look like this when it's on the screen. But I suspect it's the -- it's a printout of my group's website, its main page.

Q. When you say "group," this is your group at NC State?

A. Yes, my group from the point of view of my students and post-docs.

Q. And do you see anything inaccurate about this?

A. Like I said before, it's not updated I think recently and so it's certainly not complete, but it's -- I don't -- I'm not aware of anything inaccurate.

Q. Do you have plans to update it in the, you know, next month or two?

A. I don't have plans to update it in the next month or two. I do hope that sometime in the next year I update it.

MR. GIBSON: If we could mark this as Exhibit 1009.

(Document marked as Exhibit Number 1009 for identification.)

BY MR. GIBSON:

Q. And do you recognize Exhibit 1009?

A. I think I do.

Q. And what is it?

A. It appears to be another printout of a different page of my group's website.

Q. And is there anything on this page that's inaccurate?

A. It is not complete. It's not been updated recently, but I'm not aware of anything that's inaccurate.

Q. And it's something else that you would plan to update in the next year or hope to update in the next year?

A. I do hope to update, if I can find the time in my priority list.

Q. I think you discuss in your declaration that you've worked with students fabricating LCDs and TFTs?

A. Can you show me in my declaration where you're referring to?

Q. Yeah, let me -- I believe it's in pages 6 to 7.

A. You're referring to paragraph 9?

Q. Yes, at the bottom where it talks about you developed a laboratory course on liquid crystal displays and organic electronics.

A. I do see that in paragraph 9.

Q. Is that the research course you were talking about that also involved the lab before?

A. That is the course I was referring to before. It's -- to be precise, it's not -- I don't think it's proper to call it a research

course.

Q. It involves lab work, but it's not for research?

A. That's correct. It's for teaching, which generally has a different purpose, but it was supported by, as it says, the NSF. And so creating the course involved research into how, with basic materials, to educate the students on the organic materials and building systems without a full clean room to do so.

MR. GIBSON: If we could mark this as 1009 -- sorry -- 1010.

(Document marked as Exhibit Number 1010 for identification.)

BY MR. GIBSON:

Q. And do you recognize Exhibit 1010?

A. I think so.

Q. And what is it?

A. It appears to be another page from my group's website that in this case is focused on the lab portion of that course we were just speaking about.

Q. And is there anything inaccurate about these pages?

A. They're not current, but I'm not aware

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

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

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

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

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

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

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

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

which you've listed as 1 through 33, do any of them deal with active matrix display circuit -- peripheral driving circuits that are provided on the same substrate?

A. I should check to be sure. I believe that none of the publications in the -- listed in the journal publications include a focus on the TFT backplane, but there's a reason for that and that is that it's -- that work that I've done is in relationship with my company and other -- another company as well and for I guess business reasons, we haven't chosen to publish it.

Q. Would that be found in your patents?

A. Not necessarily. So, for example, the project that I referred to early on when I was assistant professor, some of that is published in that journal -- I'm sorry -- in that conference proceeding that I pointed to. But almost all of it is not published, expressly because it was related to intellectual property and business opportunities.

Q. And when you say the work that you did when you were an assistant professor that you mentioned earlier, what specifically are you discussing?

A. I could go back through the transcript and find that, but is that what you want me to do?

Q. No, I just want you to refresh my memory as to what you're referring to.

A. We began this deposition going through my time as an assistant professor, then associate professor and in that discussion, I referred to a project that did involve TFTs. That's what I'm referring to.

Q. That project?

A. Well, that -- yeah, that work, which depending on how you look at it, is multiple projects, but that's what I'm referring to.

Q. Any of your publications address peripheral driving circuits such as shift registers and decoders for driving an active matrix display circuit and external connecting lines for electrically connecting those circuits?

A. They do not explicitly address that.

Q. And you would agree that 1997 is the point for determining one of ordinary skill in the art for this matter?

A. I would for this matter.

Q. And what type of person would you say is one of ordinary skill in the art as of 1997?

A. Oh, I think the description in my declaration is the most helpful thing to turn to. It's in paragraph 30. It says, "I believe a person of ordinary skill in the art in the field of the '413 patent in 1997 would be aware of liquid crystal display structures including techniques for providing connections therein and to circuits outside a sealant."

Q. Do you think that person would have had any expertise fabricating those circuits?

A. I think there are many ways to get at this level of ordinary skill and some of the ways could involve not personal experience with fabrication.

Q. What about any kind of educational background? Would they need to have any kind of educational background in particular?

A. Again it's, I don't think, limited. I think there are many ways to get to this ordinary level of skill. I think the typical way would be -- would involve education, some number of years in an engineering kind of program, could be up to a Bachelor's degree, but I don't think it should be limited to that.

Q. What techniques would they have to be

aware of in 1997?

A. Well, the ones I'm specifically referring to here that I'm adopting from the case before I joined it, is providing connections therein and to circuits outside a sealant.

Q. So from your perspective, that person may not even have to have a B.S. degree?

A. I think so, yeah. I think in other countries there are many ways to get to this level of ordinary skill. Especially in Asia, I think they have different tracts that would be something less than a Bachelor's degree equivalence over here.

Q. And any type of courses that they would need to take?

A. It's hard to say. Again, they would need to understand something about semiconductor processing, but it would not necessarily have to be in a lab. They would have to understand what it means to work with a sealant and certain circuit principles and some of the basic aspects and fundamentals that relate to the materials we're talking about.

Q. What would they have to know about certain circuit principles?

A. I think, for example, they'd have to understand conductivity and how materials relate to conductivity.
Q. Anything else?
A. There are many other things that I think go into this language and a person of ordinary skill would need to understand many techniques. I think I'd have a hard time listing them out all for you.
Q. What would they have to know about a sealant?
A. I think they would have to understand how a sealant works, how it's generally applied in the field, the principles of adhesion of a sealant on various surfaces, for example.
Q. As of 1997, would you consider yourself to have qualified as a person of ordinary skill in the art?
A. I would.
Q. And what is that based on?
A. At the time I would -- by 1997, I had taken courses that involved labs as well as lectures in microelectronics, in semiconductor processing and the operations of LCDs, not just the operation, but the building and construction

and principles of LCDs, including the sealant, as well as the optics and the backplane driving principles.
So even by that time, 1997, when I finished my Bachelor's degree, I had that experience.
Q. So you would consider this to be a fairly low level for an ordinary skill in the art? It's not someone who has to have a Ph.D. or even a Master's?
A. That's -- that's certainly my intention. It's a person of ordinary skill, not an expert skill.
Q. Now, as of 1997, what type of thin film transistors were used in the manufacture of active matrix liquid crystal displays?
A. Could you be any more specific in terms of what types you mean? What are you referring to?
Q. What type of material?
A. Oh, there were many -- certainly many kinds that were used at the time commercially. I guess the big categories would be amorphous silicon. Second category would be polysilicon, and there, I think, are many others beyond that.

Q. Can you think of any others other than those two?
A. Those are clearly the primary ones. I think there are, in addition, many research level materials that were being pursued at that time, including organic TFTs and other materials, oxides of all kinds, semiconducting oxides.
Q. If we're just talking about products, liquid crystal display products, what materials were being used with TFTs? Just those two?
A. No, I would not limit it to those two. So, you know, there are other compound semiconductors. Gallium nitride, which is -- is used in some context, but clearly silicon, polysilicon -- I'm sorry -- yeah, amorphous and polydomain silicon would be the primary material used in -- by 1997.
Q. Okay. And in your publications, do any of those address amorphous silicon TFTs?
A. The publication that I pointed to earlier in my conference proceedings list, it's mentioned in my declaration, the semiconductor in that project was silicon and it was a backplane of silicon. And it's a -- yeah, it's a silicon backplane.

Q. Was it amorphous silicon?
A. I can't recall.
Q. Okay. And any of your other publications or your conference proceeding address amorphous silicon TFTs?
A. I can't recall if any of them have a mention of it, but I think you're asking for more than just a mention of it. But aside from that publication, I don't recall that any of the other ones focus on amorphous silicon.
Q. And can you tell at the time of the claimed invention, 1997, what type of TFTs were used in the fabrication of active matrix display products that had an integrated driving circuit that was on the same glass substrate?
A. Well, to be clear, I think having the active matrix and the peripheral circuits was not standard at the time and nor is it standard now. It's one of the options that can be done.
Now, I do think that if a peripheral driving circuit is present, then it's most likely amorphous or crystalline silicon that is used or a polycrystalline. It depends on the application.
Q. But in 1997 -- specifically focused on 1997 and those LCD display products, you're saying

there are ones out there that were amorphous silicon?
A. I'm not specifically aware of any, but it is possible to create something like that for -- for example, for low quality, low cost kinds of displays that one might use in toys, it may be possible to do that. It depends.
Q. Are you aware of any that were using a polycrystalline silicon?
A. Similar. Of course, polycrystalline silicon would be -- would have a better performance and could be used for that in some settings.
Q. I guess my question wasn't "could." I just want you -- to understand whether you were aware of any liquid crystal display products that were actually using a polycrystalline silicon for the TFTs?
A. I can't name a product or paper from my memory that would include that, but I expect that there are some.
Q. Now, can you point to any of your publications or conference papers in your curriculum vitae that address polycrystalline silicon TFTs?

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

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

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

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

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

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

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

BY MR. GIBSON:
Q. Do any of your printed publications or conference papers address using multiple layers of wiring to carry signals via a flexible printed circuit into an active matrix display?
A. I recall that all my work with a flexible printed circuit is unpublished.
Q. And have you -- have we discussed that work that you've done with the flexible printed circuit earlier in the deposition?
A. Some of the prototypes involved in the work we've discussed involved a flexible printed circuit onto glass substrates with an active matrix on it.
Q. And would you characterize those as having multi-layer wiring structures that are used to carry the -- that are used to carry the signals?
MR. SCHLITTER: Objection, form.
THE WITNESS: It depends on how you're characterizing that phrase.
BY MR. GIBSON:
Q. Are there multiple layers of wires?
MR. SCHLITTER: Objection, form.
THE WITNESS: Can you give me an example

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

Q. Let's go ahead and give you a few exhibits in the case, Exhibit 1001, which is the '413 patent.
MR. SCHLITTER: Thank you.
(Document marked previously as Exhibit Number 1001 was presented.)
BY MR. GIBSON:
Q. Do you recognize that as the patent that's at issue in the petition?
A. I do. It does appear to be the '413 patent.
Q. Hand you Exhibit 1004.
MR. SCHLITTER: Thank you.
(Document marked previously as Exhibit Number 1004 was presented.)
BY MR. GIBSON:
Q. And would you agree that that's the Nakamoto patent along with its translation?
A. It does appear to be the Nakamoto patent in the original and its translation.
Q. Okay. And let's give you Exhibit 1003, which is the Sukegawa patent.
(Document marked previously as Exhibit Number 1003 was presented.)

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

(Document marked previously as Exhibit Number 2010 was presented.)
BY MR. GIBSON:
Q. You understand this is a figure that Professor Hatalis created during his deposition?
A. That's my understanding.
Q. And you disagree with where he put the sealant, correct?
A. Well, my opinion more precisely is Sukegawa disagrees with his placement.
Q. But you disagree with his placement?
A. It's my opinion that one of ordinary skill would not put the seal where he has placed it.
Q. You would agree that Sukegawa would have sealant?
A. Sukegawa mentions that there is a sealant, but does not mention or disclose at all where the sealant would be positioned, except I'll note he does not illustrate it in this figure or any of the terminal portions in Sukegawa.
So I think it's fair to say that Sukegawa is teaching that wherever the sealant is, it's not where Dr. Hatalis has put it.
Q. Now, but my question was, you would

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

Hatalis?
A. The marked up figure that's here on page 48 of my declaration does show a counter substrate that shows where I think one of ordinary skill would understand that counter substrate to be if the sealant was placed where Dr. Hatalis has placed it.
Q. And the placing of the counter substrate that you have there is consistent with Nakamoto, correct?
A. Can you tell me what you mean by "consistent with"?
Q. You've placed it the same way that Nakamoto places the counter substrate over the sealant?
A. Can you tell me what you mean by "the same way"? I don't understand what you mean.
Q. Look at Fig. 9 of Nakamoto.
Do you have that in front of you?
A. I do. I now have Fig. 9 of Nakamoto.
Q. And you would agree that there's a -- in Fig. 9 we have a substrate?
A. There's a substrate and a counter substrate in Fig. 9 of Nakamoto.
Q. And there's an SL marking. Would you

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

checking terminal that is underneath element 13. And certainly in Sukegawa, having access to that terminal after the two substrates are joined is paramount. It's central to his objectives to still provide access to that checking terminal.

So if the sealant was where Dr. Hatalis put it, the counter substrate would block access to that.

BY MR. GIBSON:

Q. And it's your view in Fig. 9 it's blocked in Nakamoto?

A. In Fig. --

MR. SCHLITTER: Objection, form.

THE WITNESS: In Fig. 9, there is more distance between the counter substrate and the FPC. So it is different. I mean, they both have a counter substrate that is overhanging the sealant, that's true. But in Nakamoto, the counter substrate is well away from the FPC so that the checking terminal can still be accessed.

BY MR. GIBSON:

Q. It's still overhanging the open area that when we look at Fig. 2C it's designated 13, correct?

MR. SCHLITTER: Objection, form.

THE WITNESS: Can you point me to the particular area in Fig. 9 that you're referring to?

BY MR. GIBSON:

Q. It looks like it has the initials -- I'm not sure if it's MPX or --

A. EPX?

Q. EPX. Do you see that area?

A. I do see the epoxy region.

Q. Okay. And what does the -- you see the counter substrate's overhanging the epoxy region?

A. That's what the figure shows.

Q. And what do you understand the purpose of the epoxy is there?

A. Nakamoto describes the purpose of the epoxy as protecting the sealant.

Q. Is it also holding the two substrates together?

A. Not necessarily. If it's an epoxy, then that means it's a kind of glue and so to some extent, it's adhering at least to the sealant. But I think it's possible to design materials so that it just sticks to the sealant and not to the substrates on the other side. Clearly it's contacting it, but whether it's adhering or not is

a different matter.

Q. Why wouldn't you want it to adhere?

A. Could you repeat the question?

Q. Sure. I mean, is there -- why would you want the epoxy not to adhere to the two substrates?

A. Well, it's less about what I would want to do, of course, but what Nakamoto discloses. Nakamoto discloses two things, right? First, there's a sealant which adheres to the two substrates and keeps the liquid crystal inside between glass and then there's an epoxy that protects the sealant. There's just no disclosure that it has to adhere to the substrates.

Q. My question's a little bit different.

Why is -- why would one of ordinary skill in the art want to design the epoxy so that it wouldn't adhere to the two substrates?

MR. SCHLITTER: Objection, foundation.

THE WITNESS: I don't -- I don't think I can speculate on that.

BY MR. GIBSON:

Q. You don't know one way or the other?

A. Certainly Nakamoto doesn't disclose one way or the other and at the moment I can't -- I

don't know one way or the other what one of ordinary skill would consider in that case.

Q. In terms of -- I think you had some discussion about the repairing operation that's described by Sukegawa. Do you recall that? I think it starts on page 161 -- or paragraph 161, page 80.

A. Let me take a quick look to refresh my memory.

Are you referring to the paragraphs with letters underneath that paragraph --

Q. Yes.

A. -- 161? Okay, so they relate to the discussion of peeling, that's true.

Q. And do you have anything in your CV that discusses -- any publications or anything else, your experience on TFT LCD repair?

A. It's a -- it's certainly true that in my work I've had to repair and do my best with displays and TFT backplanes that have not turned out perfectly. I'm not sure I would call that the peeling operation that -- that is identical to what's in Sukegawa, but certainly I have faced the challenge of making the connection with an FPC to a backplane and certainly that doesn't always work

out the way we want it to.
Q. But have you published anything, patents, publications, conference papers, on TFT LCD repair?
A. I can't recall that that kind of topic is in any of my publications or patents, but certainly that kind of thing occurs when fabricating real devices.
Q. But you don't have any publications or any particular --
A. I can't recall.
Q. -- conference papers or anything like that?
A. I can't recall.
Q. You attach a number of websites to your declaration.
Did you look at any other websites that you didn't attach?
A. In this matter regarding these pages, no, I did not.
Q. And how many hours did you spend reviewing the websites on display inspection repair?
A. Do you mean specifically these approximately eight websites listed on these

pages?
Q. Yeah.
A. Not many, one hour.
Q. Would you consider that hour to make you an expert in TFT LCD repair?
MR. SCHLITTER: Objection, foundation.
THE WITNESS: I can't agree with that characterization of the time or if that would be sufficient. No, it's my general -- my own experience and my research with the processes that are listed here, my familiarity through my students' work or my own personal work that enabled me to read the websites and understand what's being talked about and fairly quickly form an opinion on the text that's largely represented here.
BY MR. GIBSON:
Q. But you would agree that just reviewing some websites wouldn't make you an expert on TFT LCD repair?
MR. SCHLITTER: Objection, form.
THE WITNESS: To be an expert, one of expert skill in the art of LCD fabrication takes much more than an hour of reviewing websites.

BY MR. GIBSON:
Q. Now, would you expect that the websites would -- say the LG website or the CPT website, the first two that you mentioned, that they would publicly disclose their proprietary information related to the display module repair procedures?
A. I would not expect any company to -- if they were smart, to disclose proprietary information about any of their processes, including repair operations.
Q. And do you have any knowledge of the proprietary information from LG -- LG or CPT on the repair process?
A. I do not.
Q. And do you know if the equipment used in display repair is exactly the same as that used in display production?
A. I'm not aware of that kind of requirement, but I am aware that as I looked into the literature for any mention anywhere in journal literature, conference proceedings or the patent literature on a repairing operation, that there was very little disclosed at all.
Q. Is that because most of it's proprietary or do you know?

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

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

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

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

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

because they damage the whole display that's already produced and being repaired. So they -- they would not -- it would not be possible to use those for the repair operation.

I also know that there are limits on the ability to create these layers that are fundamental to the materials themselves and to basic physics. So I can't even imagine another way, for example, to form a high quality ITO layer without having elevated temperatures and most likely vacuum. You could -- you could deposit the atoms, but they wouldn't conduct in the way that's necessary for this application.

BY MR. GIBSON:

Q. Okay. I don't think that was an answer to my question. My question is directed toward repair.

And wouldn't you expect that the equipment that's aimed to repair a display will only handle one display at a time?

MR. SCHLITTER: Objection, foundation.

THE WITNESS: I have no reason to -- to expect that. It could be that. It depends otherwise.

BY MR. GIBSON:

Q. Are you aware of any equipment that's used to repair multiple displays at one time?

A. I can't recall if that was within the -- what I've -- what I've seen. The very few papers that I noticed that mention repair at all do not -- I just don't recall what they said.

Q. The Pascal website that's mentioned in your paragraph D --

A. I see paragraph D. Is the attachment included here?

Q. Unfortunately not. And if we -- if you need those, then we'll have to -- I don't know if you have them handy, but we need to get a copy of them.

MR. SCHLITTER: I could -- I could get them. I'm not sure that I have them handy.

THE WITNESS: It depends most likely on your question.

BY MR. GIBSON:

Q. And we may -- we may need them for this question.

The Pascal website, does it describe a process that is aimed at displays from what you've written?

A. I'd have to see the website printout to know for sure.

MR. GIBSON: Okay. Maybe we can take a break and if I can indulge you to grab his exhibits?

VIDEOGRAPHER: We're going off record. The time is 11:48.

(Short recess.)

VIDEOGRAPHER: We're now back on record. The time is 11:56. Please continue.

BY MR. GIBSON:

Q. All right. We'll come back to that once we have the documents.

In general, in the fabrication of display products, how important is it to conserve space?

MR. SCHLITTER: Objection, form.

THE WITNESS: What space are you referring to?

BY MR. GIBSON:

Q. Well, the space in the structure itself.

MR. SCHLITTER: Same objection.

THE WITNESS: I still don't have enough information to answer your question.

Can you point me to a figure? Which

space or -- what space are you referring to in the fabrication of a display product?

BY MR. GIBSON:

Q. Well, in the -- in the multi-layer terminal portion, is it important to conserve space?

MR. SCHLITTER: Objection, form.

THE WITNESS: It depends.

BY MR. GIBSON:

Q. What does it depend on?

A. Well, there are various trade-offs that go into the design of a terminal portion. Certainly there are the technical trade-offs, but there's also the considerations of cost and the availability of the elements involved, especially the FPC.

So it depends on all those on whether -- you know, whether the area in space and size of the terminal is larger or smaller.

Q. Do the display producers try to have a large border region around the TFT array or do they try to minimize the edge area?

A. In general it is not an objective to maximize the area around a display area, that's true.

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

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

number of displays produced on a given glass substrate?
A. It depends.
Q. What does it depend on?
A. It would depend on the size of the final display/display area and the number that would be implemented there. It also depends on the design of the terminal region for a particular manufacturer. I don't think there's one answer to that.
Q. If the border area around a TFT array increases, how does that affect the total number of displays produced per glass substrate?
MR. SCHLITTER: Objection, form, foundation.
THE WITNESS: Well, in general, if you begin from a certain number of displays on a substrate, for example, four-by-three and you increase the border region of that, then at some point the increase of the border region will require you to have less than the four-by-three grid of those displays.
BY MR. GIBSON:
Q. So you would like to decrease the border region to avoid that, correct?

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

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

large distance from the sealing region, how does that impact the series resistance?
MR. SCHLITTER: Objection, form.
THE WITNESS: The basic principle of resistance is that when a conductor is longer than the resistance of that conductor or that connection will be higher. However, I don't think anybody in this case is saying that you're going to put the terminal portion a country mile away from the display portion.
We're really referring to what Sukegawa is actually disclosing and that is what I was referring to, as well as I think Nakamoto, with regard to the conductors that are shown in the terminal portion, and the terminal portion is not limited -- the terminal portion is more than just those conductors, as is shown in Sukegawa.
BY MR. GIBSON:
Q. So you would agree though that resistance is proportional to the length of the line, correct?
A. It is.
Q. So one way to reduce the resistance of the line is to reduce the length?
MR. SCHLITTER: Objection, foundation.

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

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

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

Q. And that's because you want to have a reliable connection?
MR. SCHLITTER: Objection, form.
THE WITNESS: You're asking me -- are you asking me if I think it's good to have a reliable connection in LCDs? Of course.
BY MR. GIBSON:
Q. Well, and that's what Sukegawa is directed to?
MR. SCHLITTER: Objection, form.
THE WITNESS: I'd have to read it carefully to see whether or not he explicitly speaks of a reliable connection. I just can't recall.
BY MR. GIBSON:
Q. Looking at a -- again, in Nakamoto in Fig. 9, would you agree that the placement of the sealant there is an example of where you can place sealant?
A. Nakamoto Fig. 9 certainly shows one example of where to place sealant and I think is fairly representative in this sense that the sealant is placed recessed back from the edge of the counter substrate.
Q. So you think it's a good example or

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

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

BY MR. GIBSON:
Q. But you don't know one way or the other whether that's happened here in Fig. 5?
A. In Fig. 5 it's hard to tell. If you want to identify for me where the boundaries of PSV1 are, then perhaps I could answer you better.
But from the black and white drawing at the moment, it's -- it's not apparent to me whether the seal, which is labeled, is going on top of what appears to be labeled PSV1. It's a square with a circle in it, again whether it's going on top or whether it's going around.
Q. Would you understand that the PSV1 is going from the -- from the right -- looking at the right of the figure, there's two horizontal lines that extend toward the square with the circle in it.
Would you understand that the PSV1 is going to be extending -- going from the right to the left toward that square with a circle going around it --
MR. SCHLITTER: Objection.
BY MR. GIBSON:
Q. -- and then going down to the bottom of Fig. 5?

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

think the sealant is -- maybe you could do that for me. I don't know if you have a pen.
A. I can if you --
Q. You don't have a pen?
A. -- provide -- no, I'm sorry.
Q. You can use mine as long as you promise to give it back.
A. Okay. So you're asking me to identify the seal?
Q. Where the sealant is.
A. Okay.
Q. I know where the SL is. I see where the -- where that is. I don't need you to identify the letters SL, just where you think the sealant would be and then next, I'd ask you to identify the sealant region.
A. Well, we can begin with following that label and identifying the seal, SL, in Fig. 5 and I think that's an answer to your question.
Q. Okay. Now -- yes, and that's -- that's what I understand as well.
Now, what is the -- where is the PSV1?
A. Well, you and I both can see it's labeled and it has a line going from the text that seems to point to the inside of a box that's

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

the lines in between. And there's two cuts in particular that are important, there's CT1 and CT2 and those are going to be -- those are identified as the cutting regions where the two substrates are going to be diced. And again, I see the PSV1 labels, but I can't see where they end. I can't tell from this figure.

BY MR. GIBSON:

Q. All right. So based on your understanding, they may or may not overlap the sealant, PSV1?

A. Well, based on Fig. 5, it's not clear to me. As I've already said, Fig. 9 shows it partially, only partially under the sealant.

Q. And the PSV1 that's on the left -- the left lower part of Fig. 5, doesn't that show you the extent of the overlap, that there's going to be PSV1 to that point?

A. Well, if that were the case, it would be inconsistent with Fig. 9, right. Fig. 9 shows a sealant where the right side does have PSV under part of it, but the left side does not.

And if we look at Fig. 5 and look where the sealant is, what you're suggesting to me is that the PSV1 just goes underneath the whole --

from -- from that line in the middle left side of Fig. 5 all the way to the right and that can't be. It has to end somewhere, right, because Fig. 9 shows an example of where that is. So I can't tell from this figure, this top-down, black and white illustration where those ending points are.

Q. Well, there can be multiple embodiments of a patent, right?

A. Yes.

Q. Do you know if Fig. 5 and Fig. 9 are the same embodiment?

A. I don't recall if Nakamoto describes it that way.

Q. Okay. So you can't tell where the passivation layer ends from Fig. 5?

A. Fig. 5 is not clear on where is passivation layer and where is not, PSV1. It certainly is clear, even in Fig. 5, that you have terminals, right. There's DTM terminals and then there's GTM terminals. And clearly PSV1 is an insulator that's applied after all of the conductors are deposited.

So all of the conductors have been deposited before. So to have an electrical connection to those gate and drain lines, the PSV1

would have to be removed at least partially. So Fig. 5 shows I think that, but it's not clear what else it's showing of where else PSV1 is being removed.

Q. All right. But you would know that the PSV1 is not over the DTM or the GTM?

MR. SCHLITTER: Objection, form.

THE WITNESS: Well, it's not shown in Fig. 9. I can't imagine a way to contact to those terminals if it was allowed to remain there in the final product. Clearly this Fig. 5 is an intermediate step, right, because it still has display substrates that haven't been cut to their final form. So the status of that in Fig. 5 is not clear at all to me.

BY MR. GIBSON:

Q. Would you agree that the PSV1 layer is approximately 1 micron thick?

A. I can agree that that's a typical thickness of a passivation film. I don't recall if Nakamoto specifically identifies thickness.

Q. Let's look at paragraph 90.

A. Paragraph 90 points to PSV1 as being made approximately 1 micron film thickness.

Q. And if you look at paragraph 91, which

is discussing Fig. 5, does that help you understand the extent of PSV1?

A. I'll take a minute and read it carefully. Okay. And can you remind me your question?

Q. Doesn't that inform you that -- as you said, PSV1, it's going to be laid over and then it's going to be cut back, right?

A. Openings are going to be formed in it.

Q. Openings are going to be formed in it.

And it's desirable to leave as much of the PSV1 in place as possible, right?

A. It depends. The disclosure in paragraph 91 describes removing it from certain parts. There's, I think, no teaching, explicitly at least, that you have to leave it everywhere else or that -- or that he prefers to do that even.

Q. Well, what's going to happen is there's going to be a PSV1 that's going to -- when it's laid down is going to cover up the GTM and the DTM; it's going to -- it's going to cover a large part of Fig. 5?

A. When it's deposited, it should cover the entire substrate that's below.

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

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

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

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

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

connection.
Q. Yes. There's an electrical connection?
A. So whether or not there's a direct connection, I'd have to study a bit more if that's what you're asking me about.
Q. You would agree there's an electrical connection?
A. There is an electrical connection from DL to what's identified as DTM and the FPC that's shown in Fig. 9.
Q. In Fig. 9, the ITO layer, which is that one?
A. The ITO layer is D1 in Fig. 9.
Q. All right. And would you agree that that layer is in contact with the tape carrier package?
A. Again, contact -- which kind of contact are you referring to, the electrical contact or direct contact?
Q. We'll start -- is it an electrical contact?
A. If the tape carrier package here is defined to include the conductors on the tape carrier package, then yes, the layer D1 is electrically connected. That's the whole point of

the terminal region.
Q. Would you understand the tape carrier package to be the same thing as an FPC?
A. In general, I would.
Q. Let's look at the '413 patent for a moment, which you should have in front of you.
A. I've got it.
Q. It's Exhibit 1001. If you look at Claim 1 --
A. Got it.
Q. -- and Claim 1 discusses first and second wirings that extend under the sealant, is that correct?
A. Well, to be precise, it says, "A sealant over a first wiring and a second region of a second wiring."
Q. So you would expect there to be a first wiring and a second wiring under the sealant, correct?
A. I would expect it to be --
Q. In that region?
A. -- under the sealant at least partially in that region.
Q. Would you agree that the claims don't specify whether those wirings are side by side or

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

AFTERNOON SESSION

VIDEOGRAPHER: We're now back on record. This is the beginning of Media Unit Number 3 in the deposition of Dr. Michael Escuti and the time is 1:47. Please continue.

EXAMINATION (Resumed)

BY MR. GIBSON:

Q. You understand that you're still under oath?

A. I do.

Q. Did you have a chance to talk about your testimony or substance of your testimony with anyone at any of the breaks today?

A. I've not talked about this deposition or my testimony at all.

Q. And we were covering some of the organic materials in the TFTs that you used.

What are some of the advantages of using organic materials?

A. As opposed to what?

Q. Inorganic.

A. The principal advantage is one of cost in both the material itself and in the processing. And that's why we have OLED displays rather than LED displays in our phones that are made of

inorganic materials.

Q. Any other advantages?

A. There's -- there are many other advantages. Another one is that the device structures that can be made with organic semiconductors can often be substantially different and more advantageous than it could be otherwise.

For example, there are stacking configurations that are possible and arrangements of the layers in a way that's advantageous for a particular display.

Q. Now, the '413 patent, would you agree that that's directed to inorganic TFTs?

A. The '413 is not limited in that way.

Q. Are you aware of it describing any type of organic materials used as the metal layers or instead of the metal layers?

A. The '413 refers to the conductors and the wirings as -- as being simply that, wirings and conductors in the claims. One of the examples that's given in the specification is aluminum. Claim 2 includes aluminum. So the metals are -- need to be conductors at a minimum, right? I, and one of ordinary skill, would not use an organic

semiconductor to replace a metal generally.

(Documents marked previously as Exhibit Numbers 2013 through 2020 were presented.)

BY MR. GIBSON:

Q. Let's go ahead and look at the exhibits that were attached to your declaration. I'm just going to hand you the whole stack of them. It will just be easier. Thank you for making a copy of them or having a copy made. So if we --

MR. SCHLITTER: Just to be clear, I only asked for the exhibits that were referenced in that one paragraph, 161.

MR. GIBSON: And that's what I meant to --

MR. SCHLITTER: Okay.

MR. GIBSON: -- say. So we're on the same page. That's what I've handed him and that's what I mean to ask him about at this point, not the other exhibits or the appendices. I think everything else is attached.

THE WITNESS: Which appendix do you want me to turn to?

BY MR. GIBSON:

Q. Your exhibit --

A. Yeah, which exhibit do you want me to turn to?

Q. Why don't we start -- the 2015, which is the ShinMaywa.

A. I see it. Can I a take a moment to --

Q. Sure.

A. -- review it?

Okay. I've reviewed it again now.

Q. Okay. And would you agree with me that this document is describing general purpose coating equipment?

A. This document doesn't limit the purpose of the instrument and techniques that it's referring to.

Q. But what it's describing is general purpose coating equipment, correct?

MR. SCHLITTER: Objection, form.

THE WITNESS: I think that's a bit too broad. It's describing a thin film coating technique with two specific evaporation methods. There's -- I'm sorry, two specific deposition methods, evaporation and sputtering. That's not -- I wouldn't characterize that as a general coating method.

Page 118

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

Page 119

Q. Would you agree that the -- part of the website that you've attached to your declaration does not describe a process that is aimed at displays?
A. It describes -- this document does not explicitly mention displays. It's a document about a technique of molecular beam epitaxy and pulse laser deposition. It's silent on -- it does mention some applications, but it's silent on displays.
Q. Okay. And the website, it describes a laser that's used for epitaxial materials, correct?
A. I don't think it describes it. It mentions that the process involves a laser. It doesn't say very much about it.
Q. Okay. Do you understand that it's used for epitaxial materials, a laser?
A. The laser is used to -- as a kind of exciting energy to pulse the target and get the target materials off of the target and then through the rest of the process onto the substrate that it's being deposited onto. And in this case, it's being used in a epitaxial process.
Q. Okay. And are you aware that no

Page 120

epitaxial materials are used in flat panel displays?
A. It's my understanding that epitaxial growth is not a standard process.
Q. For flat panel displays?
A. For flat panel displays.
Q. Would you understand that the size of a substrate that can fit into one of the lasers that Pascal is describing is very small?
A. What do you mean by "very small"?
Q. Well, it would be smaller than your standard flat panel displays?
A. What do you mean by "standard flat panel display"? I think all of us have typical sizes.
Q. Well, what's your -- what's your understanding of a standard flat panel display?
A. I don't think there is a standard size for a flat panel display, even in 1997.
Q. And do you know if this laser was available in 1997?
A. Well, as we said -- or as I just said, there's not much detail provided in this document as to that laser. I can speculate, but I'm not sure how helpful that is.
Q. You don't know?

Page 121

A. Well, it's a -- it's a pulsed laser and that's a family of lasers that have been well-known for decades.
Q. What's the size of -- the largest size substrate that could be used with this laser?
A. I'm not sure there is an answer to that. It would mostly depend on the size of the chamber that's, for example, illustrated in the first figure. It's, in my view, less constrained by the laser and certainly one could put multiple targets and multiple lasers in conjunction to illuminate a larger area if that was ever needed.
Q. But that's not what's being described here, correct?
A. No, no. Multiple lasers and multiple targets is not mentioned here.
Q. And you don't have an idea of what size substrate could fit inside one of the Pascal laser MBEs?
A. I don't have specific knowledge of what size could be accepted inside.
Q. Do you have any knowledge of the size?
A. I don't have any specific knowledge of the size, no.
Q. Do you know if these lasers are -- the

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

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

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

does not list display repair?
A. It does not list display repair.
Q. Would you agree that these products are not even aimed at display production?
MR. SCHLITTER: Objection, form.
THE WITNESS: I'm not sure I can go that far. It's an etching technique that, while I don't know of a specific instance where it is used, it's possible.
BY MR. GIBSON:
Q. Okay, but you're not aware of an instance where this is used for display production?
A. I'm not.
Q. And it doesn't state in the document that it should be used for display production, correct?
A. Well, it doesn't specifically mention displays, but certainly it's talking about microelectronics in general and highlights its ability to increase yields and achieve tight tolerances and all of this is consistent with its use within display production.
Q. But it doesn't talk about using it in display production, correct, the document itself?

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

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

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

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

Q. Right. You didn't -- you didn't modify the layerings or the masking process or the etching process. This is meant to reflect what would happen if you used Fig. 4 of Shiba?
A. That's correct.
Q. I'm going to show you from page 49 of your other declaration -- if we could mark this as 1012.
(Document marked as Exhibit Number 1012 for identification.)
BY MR. GIBSON:
Q. And what is Exhibit 1012?
A. Fig. -- I'm sorry, Exhibit 1012 is largely the same thing but from my other declaration.
MR. GIBSON: And let's mark this as 1013.
(Document marked as Exhibit Number 1013 for identification.)
BY MR. GIBSON:
Q. And what is Exhibit 1013?
A. Exhibit 1013 is from page 50 of my declaration for the '204 patent and it is a modification of my drawing in Fig. A, which is in the first two exhibits we just mentioned, as a

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

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

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

pad 751?
A. In Fig. A, it's not, all right, because that's -- that's what's shown in Shiba. There's no disclosure of ITO in the terminal portion. In Fig. B, I didn't apply it there simply because that's not what I'm using. That's not the area of this -- that I'm focusing on. My discussion is about the consequence of reversing the order, as Dr. Hatalis is saying, on the capacitor.
Q. Right. What I'm asking is, wouldn't you expect there to be an ITO layer on pad 751 as one of ordinary skill in the art?
MR. SCHLITTER: Objection, form.
THE WITNESS: No. That's precisely what I'm trying to get at with this Fig. B. I'm saying that, first of all, a person of ordinary skill in the art would not do anything toward this structure in Fig. B because it complicates the formation of that capacitor.
BY MR. GIBSON:
Q. Well, I'm talking about just focusing on Shiba in Fig. -- Fig. A, which is --
A. Okay.
Q. -- you're saying there would be no ITO layer on the pad?

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

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

and the pad 751. That would need to be immediately after the protective overcoat.
Q. Right. And that's what I thought I said.
A. I may have missed it. I apologize.
Q. Okay. I may have said it incorrectly, but that's what I thought I said.
That was my understanding was the next step in your modified Shiba would be you put the pad down and put the source electrode down?
A. And then after that put the protective overcoat and pattern -- pattern that.
Q. Right. Then you're going to create an opening so that the ITO can interact with the source electrode, correct?
A. There will need to be multiple openings in the protective overcoat. Of course there needs to be an opening formed over pad 751, certainly an opening to connect to the source electrode 231. And most importantly to this discussion, there would need to be an opening over the capacitor line, as I think you can see above the capacitor Cj.
And it's that opening, that etching step, that is the complicating factor for one of

ordinary skill. That's a very difficult thing to do.
Q. What are you saying is the opening on the -- are you -- you're saying the opening on protective overcoat 241 that's right above the gate dielectric 211?
A. Yes, that's the opening that I'm referring to as being difficult and not trivial and not obvious and quite a complication for manufacturing.
Q. And that's what you consider to be wrong with what Dr. Hatalis has suggested?
A. Dr. Hatalis has suggested that it's trivial and obvious to make the change that I've pictured here and I disagree. It is not obvious first because Shiba doesn't disclose it, but in addition, it creates a complication in the fabrication of that capacitor which really does require precision etching.
And for the other areas of that protective overcoat 41, the openings in the other regions, there needs to be really full etching into that. You can't under-etch protective overcoat 241 and balancing all of that is much harder than the real disclosure that's in Shiba.

Q. And did you consider other modifications?
A. At least one other modification that I considered was the process where we take the disclosure of Shiba and simply add an additional manufacturing step to apply the ITO after the protective overcoat 40 -- 241 and the pad is already formed.
So this would be somewhere very late in the process and that's another possibility, but that is explicitly against the teaching of Shiba which wants to increase or it wants to not increase manufacturing steps.
Q. Okay. Did you consider any other modifications?
A. If I didn't write about it, then I did not consider it, to the best of my memory at the moment.
MR. GIBSON: Let's mark this as 1014.
(Document marked as Exhibit Number 1014 for identification.)
BY MR. GIBSON:
Q. And I'll submit to you 1014 is another modification of Shiba and in this modification, you still put down the capacitor and scanning

lines first.
Do you see that?
A. I do.
Q. And then you next put down the gate dielectric which is the same as your modification, correct?
A. Yes, that's unchanged in any of these.
Q. In both. And what's different in this one is the pad 751 and the source electrode is now being extended over the capacitor line.
Do you see that?
A. I do.
Q. And that would still be one step, correct?
A. That would be -- applying the source electrode would still be one step.
Q. And then the next step is to apply the protective overcoat, correct?
A. I see that.
Q. And then the next step is to deposit the -- or next step is then to do some etching to create some openings, correct?
A. Well, after the deposition or growth of the protective overcoat insulator 241, there would need to be an etching step to create openings so

that you can contact the pad 751 and the source electrode.
Q. And you see that has been done in this modification?
A. I do.
Q. And that's also a step that you include in your modification, is that correct?
A. Well, creating openings in the protective overcoat is in all of these.
Q. Yeah. And then the next step is to deposit the ITO layer.
Do you see that?
A. I see that as -- as drawn, yeah.
Q. And then the final step is to deposit the orientation film.
Do you see that?
A. I do.
Q. All right. Would you agree that in this modification, there is no damage to the dielectric as the layer is going to be protected by the metal of the source electrode?
A. Well, in this hypothetical, they're -- quite apart from whether there's damage to that gate dielectric, this is now a double capacitor. It's a totally different design for the capacitor.

Page 142

You've got an electrode in the capacitor line that's labeled Cj and then you've got a dielectric. And then you've got what's illustrated here as the metal of the source electrode. And then on top of that you have another insulator and then on top of that, you have another conductor, the pixel electrode. So that's -- that whole thing forms a capacitor. One of ordinary skill would not look at this and say, oh, that's an obvious trivial modification from the disclosure in Shiba.

Q. Why not?

A. It's totally redesigned, not only the processing steps and their sequence, but it's created a totally different or new capacitor line and very nonstandard, by the way.

Q. It's the -- it's the same number of steps as the original Shiba design, correct?

A. In as -- to the extent that I understand your description of it, it seems to be the same number of steps but in a different order. And more importantly, it arrives at a structure that's -- that has a capacitor region that's very meaningfully different than what is disclosed in Shiba. And it's not trivial or obvious to one of

Page 143

ordinary skill to -- to get to here from Shiba.

Q. So let me just break this down.

You would agree that it's the same number of steps, just a different order?

A. I agree with that.

Q. Would you also agree that there's not going to be damage to the gate dielectric because there's -- the metal covering is going to protect it when the etching's done?

A. Well, the reason that changing the gate dielectric thickness is a problem is because the capacitance of that capacitor can be uncontrollable or different than it would be in the disclosure of Shiba. And this suggested structure also changes capacitance but for a different reason, right. It adds another set of electrodes and an insulator on the other side.

And so it's -- it's very dramatically and possibly even more dramatically changing that capacitance. It's a very significant design change.

Q. Okay. Let's just start with my question.

Would you agree that the gate dielectric in this modification that we're looking at is

Page 144

going to be protected by the metal layer from the etching?

A. The gate dielectric will be protected by that source electrode 231 during the etching of protective overcoat 241, but there still will be a change to the capacitance of that capacitor.

Q. I'm not focusing on the change to the capacitor.

What I'm focusing on, you said in the way Dr. Hatalis had proposed to modify Shiba, there would be a problem in damaging the gate dielectric and this modification solves that problem, correct?

A. I can't agree with that all the way because the reason it's a problem to damage the gate dielectric is because it changes the capacitance of the -- of this structure and the pixel.

And so the structure you're suggesting here may not -- may not have the risk of damage to the gate dielectric, but it creates another very serious change to the design and the capacitance. So it leads to the same eventual problem.

Q. Well, but it doesn't -- what I'm just trying to get at is, there's not going to be

Page 145

damage to the gate dielectric in this modification that's in Exhibit 1014?

A. I've already said that the source electrode is going to be above the capacitor and the gate dielectric during the etching step of the 241 layer but, again, there are other layers there that you've added and changed because of the sequence change that will lead to a serious difference to the capacitor.

Q. Now, I take it you agree that it is possible to reverse the order or to change the order of the steps so that you can have the ITO layer above the protective overcoat?

A. I agree it is possible to change the order, but I don't think it is trivial or obvious for a person of ordinary skill to begin with the disclosure in Shiba and reach to this structure.

Q. Would you agree that changing the ITO layer -- the order of the depositing of the ITO layer allows you to get the ITO layer also on pad 751?

A. Well, you're offering a hypothetical where you've drawn it that way and you've achieved the placement of the ITO above pad 751. And I disagree that this is something that a person of

ordinary skill would consider based on the disclosure of Shiba.

Q. All right. In the modification that you suggested, you could also have put the -- if you look at Exhibit 1013, you could put the ITO layer on pad 751, correct?

A. It would in that case -- I didn't draw it because I was focused on the capacitor portion, but if it were applied, the only place it could be would be above pad 751 but below the dielectric insulator called the protective overcoat 241.

Q. In your modification, it would be below?

A. I'm sorry. Yeah, I stand corrected. I'm sorry.

In my modification, it would also be above, similar to your drawing. Yes. So let me correct myself.

Q. And in your modification, wouldn't it be more appropriate to show the ITO layer on pad 751? I know that's not what you were focused on, but shouldn't you show it there?

A. I didn't need to show it. That's not the part I was talking about.

Q. But isn't it going to be sitting on pad 751?

A. I still don't think one of ordinary skill, based on the disclosure in Shiba, would be inclined to put ITO on the pad.

Q. But you agree that it's possible to do it?

A. I agree that your hypothetical makes it possible. I think your hypothetical is just not reasonable. It's not obvious, it's not trivial to a person of ordinary skill.

Q. And in your modified Fig. 4, it would also be possible to put the ITO layer on the pad, correct?

A. It would be possible. I did not draw it, but I also don't think my modified Fig. 4 is -- is an option that one of ordinary skill would take based on the disclosure in Shiba.

Q. But you could do it without adding manufacturing steps?

MR. SCHLITTER: Objection, form.

THE WITNESS: In my modification, there may not be additional manufacturing steps per se, but there's an increased sensitivity that will likely degrade yield or maybe make it even impossible to make that etch reliably over the whole display surface.

BY MR. GIBSON:

Q. Okay. And in Exhibit 1014, you agree there's no increase in the manufacturing steps?

A. 1013?

Q. 1014. 1013 is yours. 1014 is the modified one that I've handed you.

A. I agree that there's no increase in the number of manufacturing steps, but it does lead to a capacitor that's going to behave very differently. It's a very different design than what's disclosed in Shiba.

Q. And do you know how it would behave differently, the capacitor?

A. Well, this structure would -- would essentially be two capacitors in a series and there's a well-known expression from which you could calculate the difference in the change in that capacitance. It would likely be a dramatic change and the consequence of that would be that the switching speed or the time it takes to charge the pixel when the display is being addressed and being given its data signal, all of that changes very dramatically.

Q. And how do you know that? Is it just based on there being two capacitors now as you

said?

A. Specifically how do I know what?

Q. What you just said.

A. Well, basic electronics and basic electrical engineering supports the first part of what I said, that these are essentially capacitors in series.

Beyond that, I know from my experience in LCDs that this capacitor has quite a lot to do with the time -- the behavior and time of the LCD pixel, not only as it's being charged, but also its ability to hold that charge while the other rows in the display are being addressed.

Q. And why do you say that the -- creating the source electrode over the gate dielectric that is over the capacitor line creates a second capacitor?

A. Because a single capacitor has two conductors and an insulator separating them and in this case, there's three conductors with two insulating films separating them.

So the stack of this double capacitor would begin at the bottom with capacitor line Cj, then go through the gate dielectric 211 and then go to the source electrode material 231, and then

Page 150

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

Page 151

word "through" is used in a phrase that involves contact through an opening and I think it's that phrase that should be examined more than just the word "through."
BY MR. GIBSON:
Q. And you disagree with the Board's interpretation of that word, I take it?
A. I disagree with the second definition that the Board has offered in the decision. I agree wholeheartedly with the first definition.
Q. If we look at Claim 1 of the '413 --
A. I've got it.
Q. -- there are a number of different instances of the word "through," correct, in that claim?
A. There are at least three uses of the phrase "contact through an opening." I think it's in the last three elements of the Claim 1.
Q. Well, it's not always contact through an opening, right? The word "through" also appears in to be "contact through the transparent conductive layer," for example, if you look at --
A. Yes.
Q. -- line 63.
A. 163?

Page 152

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

Page 153

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

applied similar to one of the insulators that we've already talked about today and it's deposited on the whole -- the whole substrate and then needs to be patterned and opened so that there would be ability to contact through that opening to the conductive layers below.

Q. But we don't know what's going on after -- after this figure ends on the right, you don't know what's happening? There's many possibilities?

A. There are many possibilities and I think the two we identified is where this cross-section on the right side in the first region continues to the right.

And the other possibility, as you've suggested, is that at some point to the right, there's a return or the other side of the opening with -- where there's a return of the second insulator 113. Both are possible.

Q. All right. And you would find -- as one of ordinary skill in the art, you would think that one of ordinary skill in the art would find that both are possible?

A. A person of ordinary skill would find both possible and both would be consistent with

the claim language of contact through an opening.

Q. In the example that I gave where you essentially have the mirror image of 4A to the right, and you have an opening that's formed by cutting out the resin -- are you with me?

A. I am, yes.

Q. And you see that the -- the resin has a vertical wall, correct, where it ends?

A. There's a vertical wall that's illustrated for the resin, certainly.

Q. Is there any reason that this would not be a vertical wall that you can think of? Does the patent teach that it wouldn't be a vertical wall?

A. The patent doesn't -- is silent on how -- how vertical or sharp these lines are. You know, a person of ordinary skill would know that the precision of that wall shape and potential tilt angle really depends on how closely you look.

Q. But it certainly could be vertical?

A. It could be at least approximately vertical.

Q. And in one of the preferred embodiments, in Fig. 4A, it is vertical?

A. That's what's shown. That's what

Fig. 4A shows.

Q. Does the '413 patent disclose any problems with the failure of the bonding of the sealant to the substrate?

A. I believe it does. You might be able to direct me there to save us time.

Q. All right. I'm not aware of it doing that.

A. Well, let me -- let me look. Okay. Thank you for the moment to refresh my memory. It's clear from the specification that a resin inter-layer film is always disclosed as being above the wiring below the sealant in the specification and that's required in Claim 1, but there's no -- there doesn't seem to be any explicit discussion as to why that's important in the spec.

Q. And there's no discussion saying that that was a problem in the prior art, that somehow there's a problem with the sealant in the prior art and it's not bonding with the substrate because of some other structure?

A. Well, there does not seem to be an explicit disclosure of those kind of problems, but Column 3 around lines 23 to 26 say -- or disclose

the ordering of placing an inter-layer film made of a resin material on the wiring.

Q. Those are focused on height differentiation, right?

A. What do you mean by "those"?

Q. The object of the invention as described there is to reduce a height difference, not to increase bonding because there's been some problem in the prior art with bonding.

A. In this section, that's -- that's the sentence before the part that I just referred to.

Q. Even in the next sentence, it talks about it is another object of the present invention to reduce the height difference under the sealant region.

A. That's what it says, yeah.

Q. Again, it doesn't talk about there being a problem with the bonding in prior art or in the prior art, correct?

A. The specification of the '413 does not discuss a problem in the prior art. One of ordinary skill would know that there's a big difference in bonding to ITO and the resin inter-layer film material, but it's not disclosed here.

Q. Right. But that's -- that's known -- I mean, that's been known for a long time, before 1997 that it was a problem to try to bond to an ITO layer, right?

A. I think it is a principle that a person of ordinary skill would have known by 1997, that that was a situation to try to avoid.

Q. All right. So you would agree then that a person of ordinary skill in the art in 1997 would know that you would not want to have the ITO layer as your uppermost layer that would interact with a sealant?

A. I wouldn't characterize it that way. It's my opinion that a person of ordinary skill would -- would know that the adhesion between a sealant and an ITO layer would be less strong and have a shorter lifetime than one formed with a resin inter-layer film or an insulator. But still, a person of ordinary skill might still choose to make that bond anyway, perhaps because of cost reasons or a particular design in mind.

Q. But you would agree that they would also know that there would be issues with the bonding if they had the ITO layer on top, so if you -- all things being equal, you would rather not have the

ITO layer on top touching the sealants or bonding with the sealant?

A. All things are rarely equal when there's so many dimensions of tradeoffs and I think it's not clear what one of ordinary skill would do. And I certainly am aware of situations where the ITO was the upper layer and it was nevertheless still formed in that way.

Q. In what situations are you aware of that?

A. Especially in the prototypes that I've seen in my career.

Q. After 1997?

A. That would be after 1997.

Q. Have you seen any finished products since 1997 where the ITO layer was the layer that was bonding with the sealant?

A. I've seen it in some LCD systems in finished products.

Q. What ones?

A. I can't tell you their names or vendors. Quite often it's in the -- the ones I can remember, the kind of displays I can remember are those that are small that are near-to-eye displays or sometimes are called microdisplays. They're

often in projectors.

Q. So you would agree though that in terms of bonding, it would be advantageous to have the ITO layer not be the layer directly below the sealant to one of ordinary skill in the art in 1997?

A. I think one of ordinary skill would see that as -- would have known that that would make a better seal and depending on the other constraints, that may be the choice that they would take advantage of.

Q. When you say "the choice," what do you mean by "the choice"?

A. It's a design choice that's made, right, the sequence of layers, the presence of ITO there or not or whether there's an opening there or not or the insulator or not on both substrates as well. All those are things that have to be chosen.

Q. Right. Well, I'm just -- the way you answered the question, I want to make sure we're on the same page.

You agree that one of ordinary skill in the art in 1997 would understand in terms of bonding, you would rather be bonding to an

insulating layer rather than the ITO layer?

A. If nothing else mattered, then bonding to an insulating film with a sealant would be better than bonding to the ITO and I do think that a person of ordinary skill at the time would have known that.

Q. Are you aware of any prior art or any statement in the '413 describing a problem with the prior art because the ITO overlaps where the -- and touches the sealant?

A. The '413 specification and claims are silent on that.

Q. Any of the prior art references that we've discussed today, do they show the sealant in direct contact with the ITO?

A. Nakamoto shows it.

Q. Which figure in Nakamoto?

A. Fig. 9 in Nakamoto is one example.

Q. And what part of Fig. 9 are you referring to?

A. Well, at the base of the sealant that's illustrated there, the part that we've already talked about is the right side where the PSV layer is coming in from the right side and partially entering the sealant and then -- but to the left

side of the sealant, it's touching whatever is below that.

To be honest, I can't tell, now that I'm looking at it, what that layer is. I thought it was ITO, but now upon inspecting it, it may actually not be.

Q. Okay. Any other --

A. I'd have to examine Shiba to make sure Shiba doesn't show that. I don't recall that it does.

Q. If you look at -- I think we had before Exhibit -- I think it's 2010. That's the Sukegawa Fig. 2C that was drawn on by Professor Hatalis. Yes, that's it.

A. I've got it.

Q. Would you agree that in that figure, assuming the sealant is where Professor Hatalis drew it, that it is not touching the ITO layer?

A. Well, of course I disagree with the placement of the sealant there, but despite that, it's not illustrated by Dr. Hatalis as touching the ITO.

Q. It's not?

A. It is not.

Q. Is there any problem with the ITO layer

running under the insulating film that's touching the sealant?

A. I'm not sure what you mean by is there a problem.

Q. Do you have any issue with the ITO layer running under the insulating -- running under an insulating film that's touching a sealant? Do you think that would cause any issues?

A. Well, if we listen to the disclosure in Sukegawa, the ITO is present there as one of the double protection layers against corrosion. The insulating film above it is the second one. I don't disagree with Sukegawa on that.

Q. So I'm not sure, is there -- is there a problem or not with having the ITO layer run underneath the insulating layer that's bonding to the sealant?

A. In this discussion, the primary problem is that it's not disclosed in Sukegawa. That's expressly what's not disclosed. The sealant is not shown here. Wherever the sealant is, it's not here in Sukegawa. If you want me to speculate about additional problems that could happen --

Q. I don't want you to speculate. I just want to know -- I don't want you to speculate. I

just want to know if you have a view if there is an additional problem. I'm not asking for speculation.

A. I can't think of an additional problem with having ITO underneath the insulating layer 9.

MR. GIBSON: Why don't we go ahead and change the tape?

MR. SCHLITTER: Should we take a break then?

VIDEOGRAPHER: We're going off record. This is the end of Media Unit Number 3. The time is the 3:05.

(Short recess.)

VIDEOGRAPHER: We're back on record. This is the beginning of Media Unit Number 4 in the deposition of Dr. Michael Escuti. The time is 3:21. Please continue.

BY MR. GIBSON:

Q. If you'd turn to your declaration, page 23.

A. I've got it.

Q. And you've put a copy of Fig. 4A into that and then you've drawn a dotted line and designated a first and a second region?

A. That's what's shown. In fact, this is a

figure that I think I'd like to adopt another figure in place of from the decision on page 13, because my modification here identifying the regions is imprecise and not helpful in its imprecision.

Q. Why do you say it's imprecise?

A. Well, the reason I created this modified figure was to emphasize how the -- these regions are spoken of in the claim as having items that are above -- or I should say over the regions of the second wiring. And that's why I was creating it, but I didn't precisely draw those arrows to indicate what I think is the first and second region precisely. So it's misleading. So instead, it's the decision page 13 has the figure that I would like to adopt fully in place of this figure.

Q. So when you look at Claim 1 of the '413 --

A. Got it.

Q. -- in terms of the prior art, you would agree we're talking about liquid crystal display devices? No dispute there?

A. No dispute there.

Q. The prior art has a first wiring over a

Page 166

substrate?
A. Prior art does have a first wiring over a substrate.
Q. Prior art also has a first insulating film over the first wiring?
A. In some cases, yes.
Q. Like Sukegawa has that, for example?
A. For example, Sukegawa.
Q. And there's also a second wiring over the substrate and the first insulating film, Sukegawa has that?
A. Sukegawa also has the second wiring over the substrate and the first insulating film.
Q. And it also has a second insulating film?
A. Sukegawa does have a second insulating film over the second wiring, but I should note that it's -- it's not over the second wiring in combination with the other limitations of the rest of this Claim 1.
Q. I'm just going down the -- down the order. It does have a second insulating film over the second wiring?
A. To this point, yes, but to the extent that any of the other limitations affect what

Page 167

qualifies as that second insulating film, I can't agree.
But at least to this point, yes, it has another insulating film, which until this point we can identify as being over the second wiring.
Q. And a transparent conductive layer, you understand that to be an ITO?
A. I would not take that to be equivalent to ITO. ITO is an example of a transparent conductor. It's a very common choice for that, but it's not exclusively the choice that must be made.
Q. Fair enough. The transparent conductive layer, you have that in Sukegawa over a first region of the second wiring?
A. Well, there is a transparent conductor over a second wiring in Sukegawa, but I don't agree that it is in a first region in the way the rest of the claim talks about.
Q. Would you agree that there is -- somewhere in Sukegawa you're going to have sealant that is in direct contact with the second insulating film?
A. I understand Sukegawa to mention that sealant is holding the substrates together or

Page 168

it's present. Sukegawa does not disclose the location or position of the sealant at all, but I do think one of ordinary skill would identify it as between the two substrates.
Q. And because Sukegawa says there's an insulating film as the outermost layer on the substrate, you would expect the sealant to be in contact with that outermost layer?
A. If I -- if I look at the example that's illustrated in Fig. 3 or the series of Figs. 3, I think that's consistent with -- that's one example where that's the case, where the sealant is in contact with that upper insulating film.
Q. And you would agree that the second wiring overlaps at least part of the first wiring in Sukegawa?
A. Do I agree --
Q. That the first and second wiring overlap at least in part?
A. I do agree that the first and second wirings in Sukegawa overlap at least in part.
Q. And if you look at Sukegawa, Fig. 2C, the first wiring would be element 2?
A. The first wiring, Sukegawa doesn't call it simply that. He's got other names, but that

Page 169

might be a first wiring if we were to try to apply the language from Claim 1 in the '413 patent.
Q. You think a person of ordinary skill in the art would understand that, to be equivalent to a first wiring?
A. For the first wiring, I think so.
Q. And then element 3, would you understand that to be an insulating layer?
A. Element 3 is called an inter-layer insulating film in Sukegawa, and so clearly it's an insulator, and it is the first one that appears over the first wiring.
Q. And you would consider those -- the second wiring and first wiring to be in contact through the opening in insulating film 3?
A. In Sukegawa, the upper metal layer wiring 7 is in contact with the first or lower metal layer wiring 2 through the openings in the insulating layer 3.
Q. And those are vertical openings as depicted there?
A. They're depicted as vertical openings, or to be more precise, they're openings that have vertical side walls.
Q. As of 1997, you would agree that it was

standard practice for one of ordinary skill in the art to avoid sealing LCDs in a way that the sealant was in contact with a conductor such as an ITO in the terminal region and instead have the sealant be in contact with another material --

MR. SCHLITTER: Objection, form.

BY MR. GIBSON:

Q. -- such as an insulating resin?

A. Well, we discussed that before the break, right. It's a principle that would have been known to a person of ordinary skill that the adhesion in the two cases would be different. One is preferable, but not required.

Q. Would you agree that it would be standard practice to avoid sealing LCDs in a way that the sealant was in contact with the ITO layer?

A. I don't think I can characterize a standard practice. I think both were options to a person of ordinary skill.

Q. And if you'd look at your declaration on page 25, if you look at the third line, the sentence that begins, "It is therefore standard practice for one of ordinary skill in the art to avoid sealing LCDs in such a way that the sealant

is in contact with a conductor (e.g., ITO) in the terminal region with another material (e.g., insulating resin) elsewhere."

Do you see that?

A. I do. That's what it says.

Q. Do you stand by those words?

A. Yeah, I do.

Q. Would you agree that it's inappropriate to limit claims to the embodiments in the specification?

A. I agree that it's inappropriate to do in patents.

Q. So if you had to -- you would understand that -- we've gone over this -- in Sukegawa, you would have sealant and that it would be preferable to have it be near the edge of the counter substrate, but with some offset from the counter substrate?

MR. SCHLITTER: Objection, form.

THE WITNESS: Could you rephrase the question or restate it?

BY MR. GIBSON:

Q. Yeah, let me -- let me break it into two pieces. We've covered some of this before.

But in 1997, a person of ordinary skill

in the art looking at Sukegawa would understand there would be sealant present?

A. Yes.

Q. And they would also understand that the sealant is ordinarily near the edge of the counter substrate but with some offset from the counter substrate edge?

MR. SCHLITTER: Objection, form.

THE WITNESS: I'll note that the terms of "some offset" and the term "near" it's not defined in this conversation, but to the extent that there's normal meaning applied to those, then that's where sealant is placed in general, offset from the edge of the counter substrate as we looked at in Nakamoto as one example.

BY MR. GIBSON:

Q. So in Fig. 2C, where would one -- where would one of ordinary skill in the art put the sealant?

A. Well, Sukegawa, wherever it is, it's not in any of these terminal figures, including 2C. The only place it might be found would be in Fig. 3D because Fig. 3D includes the counter substrate as element 200.

So wherever Sukegawa would put it or

that a person of ordinary skill would understand it should be would be to the left side of Fig. 3D between the two substrates.

Q. And there would be -- would you agree that there would be sealant between 100 and 200 in Fig. 3D?

A. I do agree that the sealant would be in between there and, of course, that whole region is off the illustrations of cross-sections in Figs. 2C, 3B, 3E, for example.

Q. And do you know how far off it is?

A. It's not illustrated, but it's certainly not right at the edge.

Q. How do you know it's not right at the edge?

A. Well, it's not -- it's not clear, I guess I should say.

Q. You mention in your declaration that the '413 patent discloses that the sealant will include spacers in it.

A. The sealants, as disclosed in the '413 patent, is spoken of as having spacers, at least one example of that. It's not required.

Q. All right. But you use that as an example as to why there would be unevenness if you

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

A. It would depend.
Q. It would depend on what they were trying to achieve, but in certain situations, it would be reasonable to have sealant that didn't have spacers, correct?
A. By 1997, I am aware of techniques that would provide alternate means to achieve the spacing between the substrates that would not include necessarily a spacer that's in the sealant, but it still would be, by that point, I think, a fairly standard practice to use.
Q. But it wouldn't be unreasonable to use sealant without spacers, correct?
A. It would depend on the situation on whether or not it was reasonable, but it wouldn't be required.
Q. I just want to make sure, through your declaration, you're not trying to imply that the '413 patent requires the use of sealant with spacers?
A. Well, the claims do not require a sealant with spacers in it. I may need to refresh my memory on the specification and how it describes, but in any case, it would -- it would be an example of a sealant in the specification.

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

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

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

BY MR. GIBSON:
Q. I'd just ask you if you've seen this patent before today?
A. I don't recall ever seeing this patent.
Q. And again, if you'd look at Figs. 5A through 5G, and I take it these are the same figures we saw before.
Your answer would be the same, that you would need to study this and read the specification to provide testimony on it?
A. That certainly is my answer. I can take that time now if you prefer.
MR. GIBSON: If we could mark this as 1017.
(Document marked as Exhibit Number 1017 for identification.)
BY MR. GIBSON:
Q. And I'd just ask if you've ever seen Exhibit 1017 before?
A. I don't recall ever seeing this document.
Q. And if you'd look at the last page, and there's a -- there's a Fig. 9.
I take it you'd need to study this patent and these figures in order to provide

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

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

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

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

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

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

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

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

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

We went over that, right?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. SCHLITTER: Objection, foundation.

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

BY MR. GIBSON:

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

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

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

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

A. That's one way --

MR. SCHLITTER: Objection, foundation.

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

BY MR. GIBSON:

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

MR. SCHLITTER: Objection, foundation.

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

BY MR. GIBSON:

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

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

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

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

improve the reliability of an LCD by providing for the sealant to have favorable adhesion, this invention provides a structure where the sealant does not overlap the ITO film."
Do you see that?
A. I do.
Q. Is there anywhere in the specification that the patent, the '413, talks about the sealant having favorable adhesion?
A. I don't recall that that phrase is in the specification.
Q. Anything similar to that phrase in the specification?
A. Not that I recall, but here I'm recognizing that it's true.
Q. As one of ordinary skill in the art in 1997 would know?
A. I can agree with that.
Q. Now, you would agree that Sukegawa discloses a transparent conductive layer?
A. I do agree that Sukegawa discloses a transparent conductive layer in his invention as well as in the prior art that's cited.
Q. And would you agree that that's over a second wiring, that disclosure?

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

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

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

A. There is a numerically additional wiring clearly, but it doesn't meet the claim language of Claim 1 of the '413 patent.
Q. There's a -- there's a transparent conductive layer?
A. Again, there is a transparent conductive layer, but it doesn't meet the claim limitations of Claim 1.
Q. And there's an FPC, a flexible printed circuit?
A. There is that element, but it's -- it's not meeting Claim 1.
Q. Would you agree that the FPC is connected through an opening in layer 9?
A. It is maybe the only thing connecting through the opening of layer 9.
Q. So you would agree with that?
A. I do agree with that.
Q. Would you agree that if layer 9 extended over the entire transparent conductive layer 8, that the device would not function?
MR. SCHLITTER: Objection, form, foundation.
THE WITNESS: Can you tell me what you mean by "function"?

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

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

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

A. I don't recall it very specifically, so if you want me to, I'd prefer to review it so I can answer your questions.
Q. Do you have an understanding that there's been some -- a request -- should the petition be granted, there's been a request to amend some of the claims?
A. Yes, I do understand that that's the purpose of the amendment.
Q. And there's been some request to then add some limitations?
A. That's my understanding of that amendment.
Q. Do you know what limitations are requested?
A. Since I wasn't involved in writing it and I really only read it once, I don't recall.
Q. When you look at Claim 1 of the '413 patent as an example, you see that it calls for a first wiring over a substrate?
A. I do. I see that.
Q. Then it says there's going to be a first insulating film over the first wiring?
A. Yes.
Q. And then the second wiring is going to

go over the substrate and the first insulating film?
A. Yes.
Q. And then the second insulating film is going to go over the second wiring?
A. Yes.
Q. And then it talks about a transparent conductive layer over a first region of the second wiring, but it doesn't specify that it will be over the second insulating film.
Do you see that?
A. The claim does not require that the transparent conductor be over the second insulating film. It requires instead that the direct contact with the second wiring be through an opening in the second insulating film. Having a bit of the transparent conductor on top of the second insulating film as illustrated in 4A is one example.
Q. Is there another way to do that, to have the transparent conductive layer not be over the insulating film?
A. Well, if we refer to Fig. 4A in the '413 patent, an alternative would be to pattern the ITO such that that vertical edge and plateau that's

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

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

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

Q. So I take it that you would have an issue with Sukegawa showing a second wiring as it's described in the '413 patent?
A. I think we've already discussed that that's the case.
Q. All right. And you would also take issue with Sukegawa showing either a first or a second region as you've mentioned, correct?
A. I don't see a first region and certainly not a second region in Sukegawa that meets the claim limitations of the '413, Claim 1.
Q. When you look at Fig. 4A of the '413 patent, would you consider the auxiliary lines and external connection lines to be in direct contact?
A. I do consider them to be in direct contact through the opening in element 112, the first inter-layer film as it's called in the Fig. 4A.
Q. And you would consider them also to be in electrical contact?
A. Yes.
Q. What about the ITO and the external connection lines, do you consider those to be in direct contact?
A. The ITO is in direct contact with the

external connection lines through the opening in layer 113.
Q. And you would consider them also to be in electrical contact?
A. I would, yes.
Q. And you would consider the ITO and the external -- I'm sorry -- the auxiliary lines to be in electrical contact?
A. The ITO element 114 is in electrical contact with the auxiliary lines 401 in Fig. 4A through the external connection lines.
Q. And you would consider them not to be in direct contact?
A. Yes, that's exactly right.
Q. Okay. And the FPC that's depicted, albeit very generally in the -- in the Fig. 4A, you would consider that to be in both direct and electrical contact with the ITO?
A. Yes, that's right.
Q. If you look at Claim 2 of the '413 patent --
A. I see it.
Q. -- do you see using aluminum as any point of particular novelty in 1997?
A. Using aluminum for the second wiring is,

of course, one option of many.
Q. But in 1997, that wouldn't be particularly innovative, would it?
A. It would be a preferred example, but not -- not innovative to use aluminum for wirings.
Q. One of ordinary skill in the art would know that aluminum was an option in 1997?
A. Yes.
Q. And if you look at claim -- Claim 4 --
A. I see it.
Q. -- in 1997, one of ordinary skill in the art would know that a transparent conductive layer could be made from an ITO?
A. Yes, I think that would have been clear to a person of ordinary skill at the time of the '413 filing.
Q. And, in fact, are you aware that Sukegawa also discloses that?
MR. SCHLITTER: Objection, form.
BY MR. GIBSON:
Q. Are you aware that Sukegawa also discloses that the conductive layer, the transparent conductive layer can be an ITO?
A. Yes. I agree with that.
Q. Now, if you look at Claim 5?

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

is 4:49.
BY MR. GIBSON:
Q. Now, one of ordinary skill in the art would understand that if you have a deposit of a second line -- second wiring and then an insulation film on top and then an ITO layer on top of that, that the way to connect those is to create an opening in the insulation wire --
MR. SCHLITTER: Objection as to form.
BY MR. GIBSON:
Q. -- the insulation line?
MR. SCHLITTER: Form and foundation.
THE WITNESS: To some extent it does depend on the situation. It's I don't think possible to answer that in a vacuum without some more context.
BY MR. GIBSON:
Q. Well, in 1997, if you were going to have a structure that has a second wiring and then an insulation layer on top of that and then a transparent conductive layer and you want to connect those two, one way to do that in 1997, it was known to open up the insulation layer?
MR. SCHLITTER: Objection, form.
THE WITNESS: I can agree that it was

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

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

be the same in that situation, right?
A. That's correct.
Q. And the order of deposits would still be the same?
A. The sequence of the manufacturing to make the element in Claim 1, I believe is uniquely specified.
Q. And it's always going to have the order that's specified in 4A under your view of Claim 1?
A. And which order are you referring to?
Q. Well, you're going to have a substrate first. You're then going to have your auxiliary lines. You're going to have a first insulating layer, then you're going to have external connection lines, an ITO -- then you're going to have external connection lines and a second insulating layer and then your ITO layer.
That's going to be the order of deposit as set forth in Fig. 4A and is what you say is mandated also by Claim 1?
A. You didn't mention anything about the first region and second region and the sealant. But aside from that, the order of the elements that you specified or that you listed I believe is dictated by the language of the claim as is.

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

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

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

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

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

correct.
BY MR. GIBSON:
Q. That's in 1.12 in your declaration, there's contact through the transparent conductive layer?
A. That's correct. The electrical contact is by means or via the transparent conductive layer to the second wiring and the FPC. So in other words, the second wiring and FPC are in electrical contact because of the transparent conductive layer. It's an alternate way to read that.
Q. And when we look at 1.13 that does use direct contact through an opening, you're using the definition of "through" as because of?
A. Whenever --
MR. SCHLITTER: Objection, form.
THE WITNESS: In both uses of the phrase in the claim, "contact through an opening," it -- a person of ordinary skill would hear that as consistent with definition of via, because of, certainly.
BY MR. GIBSON:
Q. And that's how you're using it in 1.13, correct?

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

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

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

Q. What we're wanting to do is if you have a -- two metals that are contacting each other and you're going to have an insulating film and you need to have -- and that insulating film -- in one situation you've got the -- we'll take the top one first.
In the first one, we've got the metal deposited, right? And then we deposit an insulating film over the metal, metal 1. We etch out that insulating film so that we can deposit metal 2, right?
A. I see that.
Q. And then metal 2 is deposited.
A. I see that.
Q. And so we've created an opening in -- in the insulating film, correct?
A. Based on your assumptions and what you just described, it sounds like you have created an opening in the insulating film and then -- and then deposited metal 2 through that opening, yes.
Q. Okay. And now we want to be able to connect a third metal to metal 2 and metal 1.
Would you agree that first structure would be able to do that?
A. I don't see the third metal, so I'm not

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

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

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

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

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

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

Page 230

substrate. The first layer that's shown there is -- corresponds to the gate dielectric 211. And then the next smaller rectangle, smaller at least from left to right, would be the pad 751, a conductor.

Q. It's another metal?

A. Well, it's the first metal in this -- in this terminal.

Q. And then you have the ITO layers on top?

A. So I'm taking the terminal portion of Fig. 4 in Shiba which begins from the substrate and then the dielectric and then the first conductor is this -- at least in this portion, this pad 751. There's no other conductors below it.

And I'm hypothesizing applying the teaching in Sukegawa to create an ITO layer in the terminal region and if that was done, it would necessarily be below protective overcoat 241. I don't think it's obvious to a person of ordinary skill to do that, but I'm hypothesizing that if it is done, then Fig. C on the left is what would result.

Q. And what's going to be connected to the ITO or what's going to go on top of the ITO?

Page 231

MR. SCHLITTER: Objection, foundation.

THE WITNESS: In this -- in this hypothesis?

BY MR. GIBSON:

Q. Uh-huh. Yes.

A. Again, I'd have to see my declaration to see what the discussion was specifically. I don't think I commented on that.

Q. Would you agree with me that what you've drawn in 1020 is -- strike it.

Well, Fig. D in 1020 is similar to the top of Exhibit 1019?

A. What's 1019? Oh. It's similar in the sense that the -- there's a metal 1 and then there's a conductor that in 1019 is called metal 2, but in Fig. D, it's an ITO layer, which is not a metal. It's a conductor, but it's not a metal.

Q. But the way you would go about creating Fig. D would be you're depositing -- I guess the gate dielectric's going to go first, but then you're going to have your first conductor, then you're going to deposit the protective overcoat. Then you're going to deposit -- then you're going to etch the protective overcoat and then you're

Page 232

going to deposit the ITO?

A. That sequence of elements is the way that I think Fig. D could be constructed. I think pad 751 is just that, it's the pad here. It's not what I would point to as a first wiring in this discussion, but it is a metal and it's -- it's applied. And then the insulator could be -- would need to be applied and then an opening created in it and then finally the ITO deposited and patterned after that.

Q. And those are the steps that we're seeing in the first -- the first drawing on Exhibit 1019. We have a metal 1, then an insulating film, then second, in this case, metal 2 but it could also be a conductive layer?

A. If we're not concerned about what the conductor material is made of, then it is the same between Fig. D and the upper illustration of 1019.

Q. Okay. And then in Fig. C, what are you showing happening in Fig. C?

A. Isn't that what I just commented on?

Q. I think we were dealing with Fig. D.

A. Okay. Well, Fig. C represents what I think would result from beginning with Shiba and having a person of ordinary skill apply Sukegawa

Page 233

to Shiba. I don't think that's appropriate. I don't think it's obvious to do so. But if that was done, the structure that would result would be Fig. C.

Q. And the order of the steps, what would those be?

A. Well, the order of the steps would, like in Shiba, be the conductors that would wind up being, at least in this figure, first applied to be pad 751. That would have to be patterned. Then an ITO layer would need to be applied, and then finally, protective overcoat and then that would need to be patterned to have an opening.

Q. Would you agree that in Exhibit 1019, we're seeing those same steps, seeing a metal 1 deposited first, then you're seeing a metal 2, which in your Fig. C is an ITO, and then we have the insulation film, that order?

MR. SCHLITTER: Objection, form.

THE WITNESS: The order that -- of deposition and patterning steps appears to be the same and I think would appear to be the same for a person of ordinary skill between Fig. C and the second figure in 1019.

BY MR. GIBSON:
Q. Now, what you drew at the bottom of Exhibit 1019, could you apply that to Sukegawa somehow?
A. It sounds like you want me to speculate on --
Q. I'm just asking if --
A. -- something.
Q. No, I don't want you -- I don't want you to speculate at all. That's never -- that's never what I'm asking you to do.
What I want to know is, what you drew in Exhibit -- at the bottom of Exhibit 1019, is that a structure that you think one of ordinary skill in the art would apply to Sukegawa to modify it?
MR. SCHLITTER: Objection, form and foundation.
THE WITNESS: It depends. I mean, my figure was in response to your request that I imagine another way to connect three metals and an insulator.
BY MR. GIBSON:
Q. Right.
A. And there are more. There are many more than what I've just shown here.

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

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

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

counter.
Q. If you could turn back to Exhibit 1014, this is the modified Shiba. You have that in front of you?
A. I do have it.
Q. I want to make sure I understand where the three capacitors are.
A. There's two capacitors.
Q. Okay. You're saying there's two capacitors and the first one is in pink?
A. Well, a capacitor is formed with three elements. The first element would be a conductor. That would be the pink element. The rest of the capacitor would be the dielectric, which is in orange. I guess it's 211. And then finally, the black or dark brown illustrated here as an extension of the source electrode 231.
Q. Okay. So that's -- that's one capacitor.
And what is the second one, just the pixel electrode itself?
A. Well, no. All capacitors have to have two conductors and an insulator somehow in between. So the other one begins with the source electrode 231, proceeds up where the insulator is

the protective overcoat 241 and then the final conductor is pixel electrode 271 in this illustration.
Q. I see. And that forms a second capacitor?
A. It's a --
MR. SCHLITTER: 251.
THE WITNESS: I'm sorry, yes, 251 is the pixel electrode. So those three elements form an additional capacitor that is, in principle, in series with the first.
BY MR. GIBSON:
Q. Okay. And the source electrode is part of both capacitors?
A. Yes. This sounds like a fairly hard final exam question that I give my electromagnetic students where I ask them to derive the capacitance of the three electrode capacitor.
Q. I'm hopeful that this is all very challenging.
Would you agree that the pixel electrode and the source electrode are in contact?
A. They have a small bit of contact limited on the right side of this illustration, yes.
Q. That's where the blue is touching the

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

A. By "first capacitor," do you mean the capacitor formed by the capacitor line Cj and the extended source electrode 231?
Q. Yes.
A. That's not disclosed in Shiba at all, of course.
Q. Do you think there's a capacitor in Shiba?
A. There certainly is a capacitor in Shiba and it's formed between the capacitor line Cj and the pixel electrode 251 with the gate dielectric 211 in between.
Q. So why don't you turn to paragraph 62?
A. In my declaration?
Q. Yes. I'm not sure that's the -- actually the right paragraph. I don't think that's the right paragraph.
Let me ask you this, in 1997 -- well, probably going to need you to have the '403 patent in front of you. If you look at Fig. 4A --
A. Do you mean the '413 patent?
Q. I'm sorry, the '413 patent, Fig. 4A.
A. I see it.
Q. Too many patent numbers in the case.
I think we covered this a little bit

before, but the connection that's being made between the lines 401 and 403 through the inter-layer film, that's something that was known in 1997 before the '413 patent, correct?

A. Making connections through openings in an insulating film similar to what's represented here was well-known to a person of ordinary skill. And that phrase "contact through an opening" is representative of that enigmatic term in the art.

Q. Would you consider this to be a multi-layer wiring?

MR. SCHLITTER: Objection to form.

THE WITNESS: What specifically are you asking about?

BY MR. GIBSON:

Q. The connection between -- well, not the connection, but the way that 111 and -- 111 -- sorry -- 401 and 403 are depicted in Fig. 4, would you consider that to be multi-layer wiring structures?

A. I would not.

Q. Why not?

A. And I also don't think a person of ordinary skill would call it that in this context. Well, the specification in the '413 and the claims

refer to those elements 401 and 403 as separate wirings, a first wiring and a second wiring in the claim.

Of course it has different words in the figure, and so this is a single connection that involves two wirings, but I don't think it's fair to characterize this as a multi-layer wiring.

Q. What would you characterize as a multi-layer wiring?

A. What would I characterize as a multi-layer wiring?

Q. Yes.

A. It would depend on the context.

Q. Can you give me an example?

A. I can. Several of these patents refer to a conductive path, a bus line or a scan line or data line that's formed with two metals, chromium first in a thin layer and then aluminum in a thicker layer. In many contexts, that's multi-layer wiring.

Q. Would you consider that kind of wiring to be well-known in 1997?

A. I would.

Q. And what's the advantage of the structure that's shown in Fig. 4A in terms of the

two wires and how they're connected through the insulation film?

A. Are you referring to the -- what's labeled as 401 and 403?

Q. I am.

A. There's at least two advantages that I think are identified in the spec that -- at least as best I recall, first these lines, of course, extend to the left in this illustration and go across the sealant and that can be -- and so going from the right side, the terminal portion, to the left under the sealant in this illustration would mean that the resistance of that connection from the right side, the terminal in this illustration to the left through the sealant, that resistance is lowered.

An additional benefit or advantage is that the -- there's redundancy in those wirings and in this structure. So that's definitely an advantage in this context.

Q. And in 1997, were those advantages well-known to someone of ordinary skill in the art?

A. In this context, no.

Q. I don't mean -- I don't know what you

meant by "in this context," but what I'm saying, having a -- two wires connected through an insulation layer, were there advantages to those that were known to people of ordinary skill in the art in 1997?

A. For a terminal connection in an LCD that was not -- not known to a person of ordinary skill. Sukegawa comes maybe the closest, but he ends the upper layer -- upper metal wiring every time in his disclosure.

Q. Were there -- are you aware of other instances where you have two wires that are connected through a contact hole prior to the '413 patent?

A. Well, I suppose nearly every microelectronic circuit -- circuit since circuits began being integrated and patterned in semiconductor processes had two wirings connected through a hole and an insulating layer.

Q. And can you give some examples of those?

A. Well, that kind of connection is very common in semiconductor chips where there are typically multiple levels of wiring and CPUs, graphics chips, wi-fi chips. And in those cases, I think there are connections made between those

Page 246

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

Page 247

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

Page 248

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

Page 249

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

Page 250

A. Well, again, there are many situations where there's a circuit that has a metal wiring on one layer and then an insulator and then another metal. The kind of chips that we have nowadays have, I think, half a dozen. It's very common. And even my students prototype PC boards with multi-layer wiring. That's not semiconductor-based, but it's simply proto boards.

And in those cases, of course, they have an insulator, they have different levels of wiring, and they often make holes in the insulator and make contact through them. It's a way to make contact between metals that are in different layers.

Q. But it doesn't have any other advantages, it's just a way to make contact?

A. I wouldn't characterize it that way. I'm saying that's -- that's what one of ordinary skill would begin with. There may be advantages to that beyond it. Sukegawa has one. There may be more.

Q. And as of 1997, are you aware of what those would be?

MR. SCHLITTER: Objection, form, foundation.

Page 251

THE WITNESS: As I sit here now, I can't speculate and list them all for you.

BY MR. GIBSON:

Q. Okay. Can you list any additional ones?

A. Any addition --

MR. SCHLITTER: Same objection.

BY MR. GIBSON:

Q. You've listed corrosion as being one or resisting corrosion as being one.

Are there any others that you can identify as of 1997?

MR. SCHLITTER: Object. I think this is beyond the scope of his declaration.

MR. GIBSON: I don't agree.

THE WITNESS: I'm having a -- having a hard time understanding your question. I know you don't want me to speculate, but that's what it sounds like you're asking me to do.

BY MR. GIBSON:

Q. Well, I don't want you to speculate. I'm just asking if you can identify any other advantages. You said there may be more. I'm just wondering if you can identify any of those.

MR. SCHLITTER: Objection, scope.

THE WITNESS: At the moment, I can't think of any more.

Page 252

BY MR. GIBSON:

Q. So if we look at Sukegawa again -- maybe we'll look at 1B this time.

A. I've got it.

Q. And would you consider this to depict multi-layer wiring, a multi-layer wiring structure?

A. I would not and I think Sukegawa would also not call it that.

Q. What type of structure would you call it?

A. I think a person of ordinary skill at the time of the '413 patent would call this a structure that -- that has multiple wirings in it and insulators. So if you're referring to elements 2, 3, 7 and 8, then it's a four-layer structure.

Q. With multiple wirings?

A. With multiple wirings.

Q. Would you consider those wires to be deposited in a layer?

MR. SCHLITTER: Objection, form.

THE WITNESS: Which one in particular or --

Page 253

BY MR. GIBSON:

Q. Well, let's take 2. Is that deposited in a layer on the substrate?

A. Well, whether it's a layer, it does depend on the context. The word "layer" can be used in lots of different ways that can be misleading. So, I mean, certainly layer 2 is simply deposited or grown on the substrate 1. And I think, at least in some contexts, that could be called not only a wiring, but that could be a layer.

Q. What about wiring 7, can that be deposited on a layer?

A. Well, 7 is also a conductor that's deposited in a single step and also then patterned subsequently. I can imagine contexts where that is by itself called a layer, but not this one, because it's referred to here as a wiring.

Q. If it called it a layering, would that change your view?

A. If there was a context where element 7 was called a layer?

Q. Yes.

A. I'm not sure.

MR. SCHLITTER: Objection, foundation.

Page 254

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

Page 255

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

Page 256

corrosion?
A. I agree that that's what Sukegawa says and I have no reason to disagree with that.
Q. Would you agree that it's used extensively in the microelectronics industry as a final passivation or protection layer?
A. Yes, it's very common.
Q. And if you look at -- let's look at Fig. 3C.
A. I see it.
Q. And focusing on the right side of Fig. 3C, do you see layer 9?
A. I do see it.
Q. And would you agree that it's going to be present to the right of the arrow labeled "for terminal portion"?
A. Well, there's two "for terminal portion" labels, one to the right and one to the left.
Q. I'm talking about the one to the right.
A. And the one on the left does not have layer 9 on it, of course, but the one on the right does. So I would understand it, at least on the right side, to extend -- what's implied here is that it extends all the way to the terminal portion.

Page 257

Q. And if we look back at Fig. 1B --
A. I've got it.
Q. -- do you see that there's layer 9 on the left?
A. I do.
Q. And it's going to be extending to the display portion, is that correct?
A. I do see what Fig. 1B says about that, sure. Element 9 is there. It's on the left side of Fig. 1B and I think what's implied is that it would extend to the left toward the display portion.
Q. Without interruption?
A. I can't say.
Q. Is there anything that tells you it would be interrupted somewhere along that path?
A. Well, the one thing that tells me that, at least occasionally in Sukegawa's mind, element 9 does get interrupted is Fig. 3C where it's interrupted on the left side of that figure and I can't say.
Q. I'm not talking about the left side, though. I'm talking about Fig. 3C from the right extending to Fig. 1B of the left.
Is there anything that tells you that 9

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

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

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

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

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

side?
MR. SCHLITTER: Objection, form.
THE WITNESS: On the bottom and right-hand side are the short rings, as they're called, and these are helpful in manufacturing to minimize the static buildup that occurs during fabrication. So those are wirings. Those are conductors.
BY MR. GIBSON:
Q. But sure not sure whether those are data lines or scan lines?
A. I would hesitate to call them data lines and scan lines simply. I think they're something more. They may be formed in the same metal deposition process, but they are something distinct, something different.
Q. Do they -- in addition to perhaps doing other things, do they serve the purpose of scan lines and data lines?
A. Certainly not external to the sealant, no.
Q. Would you agree that the lines are extending outside the display portion at the bottom and right-hand side?
A. Those short rings 1509 do extend outside

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

printed circuit 31 to the display. And then to the right, this structure 32, 33, 300, all of that, that goes then eventually to the right side to connect to the drivers.
Q. All right. So you would agree that there -- there have to be some external display drivers in Fig. 3D?
A. I don't agree that there would have to be. There would certainly need to be something that this flexible printed circuit connects to. Sukegawa I don't think refers to internal peripheral circuits inside the display explicitly, but I don't think there's any disclosure against that or away from that.
Q. Okay. But one possibility that you would see from Fig. 3D or the person of ordinary skill in the art would see in 1997 was a possible use in Fig. 3D of external drivers?
A. I think a person of ordinary skill would read the disclosure in Sukegawa and understand that the drivers in his examples are external to the display on the right side of Fig. D, not shown.
Q. And how many types of external drivers would there be?

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

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

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

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

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

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

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

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

THE WITNESS: Yes.
Ah, finally.
BY MR. SCHLITTER:
Q. Okay. Exhibit 1011 is from page 94 of your declaration in the '413 case?
A. Yes, it is.
Q. And you mentioned that -- on your direct testimony or your cross testimony that the capacitor line Cj and the scanning lines Yj would be the first thing that would be formed as shown in this figure, correct?
A. Yes, that's correct.
Q. And the second thing that would be formed would be gate dielectric 211?
A. That's correct.
Q. Do you see the two white rectangles overlying the scanning line, vertically above the scanning lines Yj?
A. I do.
Q. What are those?
A. Those are the semiconducting layers that form the channel of the TFT.
Q. What is the difference between the smaller rectangle on the top and the larger rectangle on the bottom, the white rectangles I'm

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

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

INNOLUX CORPORATION,)
)
Petitioner,)
)
vs.) IPR2013-00066
) U.S. Pat. No.
SEMICONDUCTOR ENERGY) 7,876,413
LABORATORY CO., LTD.,)
)
Patent Owner.)

I, MICHAEL J. ESCUTI, Ph.D., being first duly sworn, on oath say that I am the deponent in the aforesaid deposition taken on September 5th, 2013; that I have read the foregoing transcript of my deposition, consisting of pages 1 through 278 inclusive, and affix my signature to same.

_____ as it now appears
_____ as it now appears with corrections

MICHAEL J. ESCUTI, Ph.D.

SUBSCRIBED and sworn to before me this _____ day of _____, 2013.

_____
Notary Public

CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

I, Sandra L. Rocca, a State of Illinois licensed Certified Shorthand Reporter, License No. 084-003435, do hereby certify:

That on the 5th day of September, 2013, at 9:39 a.m., 115 South LaSalle Street, Chicago, Illinois, the deponent MICHAEL J. ESCUTI, Ph.D. personally appeared before me;

That the said MICHAEL J. ESCUTI, Ph.D. was duly sworn by me to testify and that the foregoing was stenographically recorded and constitutes a true record of the testimony given and the proceedings had at the aforesaid deposition;

That the deposition terminated at 6:37 p.m.;

That the reading and signing of the deposition was not waived, and the deposition was submitted for signature. Pursuant to Rule 30(e) of the Rules of Civil Procedure, if deponent does not appear or read and sign the deposition within 30 days, or make other arrangements for reading and signing, the deposition may be used as fully as though signed, and this certificate will then evidence such failure to appear as the reason for

signature not being obtained;
That I am not counsel for nor related to any of the parties herein, nor a relative or employee of such attorney or counsel for any of the parties hereto, nor am I interested directly or indirectly in the outcome hereof.
IN WITNESS WHEREOF, I have hereunto set my hand and seal of office this day of , 2013.

SANDRA L. ROCCA, CSR, RPR, RMR, CRR
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Expires May 31, 2015

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