Transcript of Matthew Turk, Ph.D.

Date: July 21, 2026
Case: Samsung Electronics Co., Ltd., et al. -v- Maxell, Ltd. (PTAB)

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners,
v.
MAXELL, LTD.,
Patent Owner.

Inter Partes Review No. IPR2025-01312
U.S. Patent No. 7,952,645

VIDEOCONFERENCE DEPOSITION OF MATTHEW A. TURK, PH.D., taken remotely via Zoom on behalf of Petitioners, commencing at 8:54 a.m., Tuesday, July 21, 2026, before Marla Sharp, RPR, CLR, CCRR, CSR 11924.

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DEPOSITION EXHIBITS

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I N D E X

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TUESDAY, JULY 21, 2026

8:54 A.M.

- - -

DEPO TECH: Zoom will now prompt you for your consent to video record this meeting for backup purposes.

Thank you to everyone for attending this proceeding remotely, which we anticipate will run smoothly. Please remember to speak slowly and do your best not to talk over one another.

Please be aware that we are recording this proceeding for backup purposes. Any off-the-record discussions should be had away from the computer. Please remember to mute your mike for those conversations.

Please have your video enabled to help the reporter identify who is speaking.

We will provide a complimentary unedited recording of this deposition with the purchase of a transcript.

I apologize in advance for any technical-related interruptions. Thank you.

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- - -

DR. MATTHEW A. TURK,

having been first duly sworn,

was examined and testified as follows:

- - -

THE STENOGRAPHER: Thank you.

And my name is Marla Sharp. I am a stenographer licensed in the State of California, license No. 11924. Thank you.

Counsel, you may proceed.

- - -

EXAMINATION

BY MR. BUERGI:

Q Dr. Turk, would you state your full name, please?

A Matthew Alan Turk.

Q Dr. Turk, my name is Robert Buergi. I'm an attorney at the law firm DLA Piper. And my firm represents Samsung in the IPR related to the '645 patent.

Do you understand that?

A Yes.

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Q Do you understand that you're here today to testify related to the '645 patent IPR?

A Yes, I do.

Q How many times approximately have you been deposed before?

A I think close to 20, maybe 18 to 20.

Q And when approximately was the last time you were deposed?

A Last Wednesday.

Q Have all of those 18 to 20 times that you've been deposed been in the context of your being an expert witness?

A Yes, they have.

Q In light of your having been deposed approximately 20 times before, I'm sure you're well versed in how depositions work, but I'm going to go over some rules and guidelines anyway.

Is that okay with you?

A That's fine.

Q Okay. Do you understand that your testimony here is under oath as if you were testifying in court?

A Yes, I do.

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Q The court reporter is transcribing what we say in real time. So to make her life easier, it's important that we try not to talk over each other.
Does that make sense?
A Yes, it does.
Q So to that end, I will try to wait for you to finish your answer before I ask my next question. And if you try to wait for me to finish my question completely before answering, that will make her life easier.
Does that make sense?
A Yes.
Q Your counsel, Mr. Kelly, may object to some of my questions. But even if he objects, you still need to answer the question.
Do you understand that?
A Yes.
Q The only time you have the option to not answer a question is if he instructs you not to answer.
Does that make sense?
A I understand, yes.
Q Okay. Is there any reason why you can't

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provide your complete and accurate testimony today?
A No.
Q Are you on medica- -- any medication that might affect your ability to give testimony today?
A No, I'm not.
Q And is there any other reason why you might not be able to provide your full testimony today?
A No, there's not.
(Mr. Sigmon entered the proceedings.)
BY MR. BUERGI:
Q We'll take breaks periodically.
But if you ever need a break, just let me know. The only thing I ask is that if there's a question pending, that you answer the question before we take a break.
And if we're in the middle of a line of questions, I might ask that we finish the line of questions before we take a break.
But if you need to take a break, just let me know. Okay?
A I'm drinking coffee, so I may need that. But thank you.

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Q Okay. Because this is a deposition related to an IPR, there are some rules that might be slightly different from other depositions you've attended.
And one of those rules is that during the breaks, until I'm done with my questioning, you're not allowed to speak to counsel or, really, anyone, about the substance of your testimony.
Do you understand that?
A Yes, I do.
Q So you can talk to counsel about the World Cup or the weather or things unrelated to the substance of your testimony, but you're not allowed to talk to him about the substance of your testimony.
Does that make sense?
A Yes.
Q Okay. Will you try to abide by that rule?
A I will, yes.
Q And because this is a remote deposition, I can't hand you any paper, obviously. But I assume you've done depositions remotely before. Is that right?
A Yes, I have.
Q Okay. So when we use exhibits, I will upload

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PDFs to the chat window, and you can download them. And then you can review them locally on your computer there.
Does that make sense?
A Yes.
Q Have you done that before in depositions?
A Yes, I have.
Q Are you comfortable doing that today?
A Yes, I am.
Q Okay. Great.
So because this is a remote deposition and we're not in person, I can't -- I can't see what you have in front of you there. So I'm going to ask you some questions about what you have in front of you and what your setup is there. Okay?
A Okay.
Q So I assume you have a computer there. Is that right?
A Yes, it is.
Q Is it just one computer or multiple computers?
A I have multiple computers in this room, but only one of them is turned on.
Q Okay. And do you have any documents or paper

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in front of you?
A I do not. There are various documents in various places in this room, but nothing is within reach and nothing's open.
Q Do you have in that room copies of anything you anticipate using during the deposition, paper copies?
A No, I don't.
Q Do you have in that room any paper documents related to the '645 patent IPR?
A I don't think so, no.
Q On your computer, do you have any applications or windows or programs open other than the Zoom window?
A No. Zoom is the only thing that's open right now.
Q Okay. Do you have any documents open on the computer?
A No. Again, Zoom is the only thing that's open.
Q Okay. If you open anything related to your testimony or related to the IPR during the course of the day, other than the exhibits that I provide, will you please let me know?
A Yes.

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Q If you open something to check the weather that's not related to the deposition or the IPR, I don't need to know about that.
A Understood.
Q What did you do to prepare for today's deposition?
A I read through the various materials that I think are relevant, including my declaration, the '645 patent, the asserted prior art, some other documents.
I met with Mr. Kelly and Mr. Sigmon, I think, a couple times, and generally reviewed materials.
Q Can you remember any documents that you reviewed that you didn't name already?
A I looked -- I reviewed the petition. I reviewed Dr. Schoenberg's declaration. I don't remember what else.
Q I think I heard you say "Schoenberg."
Are you referring to Dr. Schonfeld?
A Ah, yes. Thank you. My mistake.
Q No problem. You said that you met with Mr. Kelly and Mr. Sigmon; is that right?
A Yes.

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Q Was that an in-person meeting or phone calls or both?
A It was remote meetings only.
Q Okay. Were those video calls?
A Yes.
Q And how many video calls were there?
A Are you asking in particular in preparation for this deposition?
Q Yes.
A I believe two.
Q Did anyone other than Mr. Kelly and Mr. Sigmon join those calls ever?
A No.
Q Approximately how long were each of those calls?
A Of the two I'm thinking of, I believe the first was probably about an hour. And the second was probably about two hours, but that's a very rough guess. I'm not sure.
Q Did you do anything to prepare for today's deposition that we haven't discussed?
A Not that I can think of.

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Q Dr. Turk, in what fields do you consider yourself to be an expert?
A I would say broadly in computer science and engineering. And, more specifically, in computer vision and image processing and pattern recognition and AI machine learning areas.
And also human -- aspects of human-computer action -- human-computer interaction, virtual and augmented reality, and some other areas in the broader disciplines of computer science and computer engineering.
Q And do you consider yourself to be an expert in the field of video processing?
A Yes.
Q Do you draw a distinction between video processing and image processing?
A I generally think of video processing as a subset of image processing.
Q It's time for our first exhibit, so -- by the way, I should mention that some exhibits today that we will use are exhibits from the IPR. And those exhibits have numbers already. In your review of the materials,

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you may have seen exhibits like Exhibit 1001, Exhibit 1002.

Some of the exhibits we'll use today are not from the IPR, so we're going to mark those Exhibits 1, 2, 3, 4.

So the exhibit numbering will be not necessarily sequential today. It might be 1, 2, 3, 4, and then 1001.

Does that make sense?

A Yes.

Q But if you want, you can note the number of a particular exhibit when you download it, or if you have a piece of paper there, you can note it on a piece of paper, whatever you want.

Does that make sense?

A Yes.

Q And if I refer to an exhibit number and you're not sure which one it is, I will -- I can just tell you which one it is too.

Okay. Exhibit 1 I will upload to the chat window.

And would you download that and let me know

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when you have done so, please?

A Okay.

Q And if you want to take a second to make the file name reflect that it is Exhibit 1 on your end, feel free to do so.

A Sure.

(Deposition Exhibit 1 was marked for identification.)

BY MR. BUERGI:

Q Exhibit 1 is a document titled "Perceptual Interfaces."

Is that the document you're looking at?

A Yes, it is.

Q Okay. And are you able to scroll through it?

A Yes.

Q Okay. Feel free to scroll through it -- let me know when you're done -- just to familiarize yourself with it.

A Okay. I'm done.

Q Do you recognize this document, Exhibit 1?

A I generally recognize it. I haven't seen this for a long time, but -- but, yes, I recognize it.

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Q What is it?

A It is a report that a PhD student of mine, Mathias Kolsch, and myself wrote -- looks like about 23 years ago.

Q Were you the lead author on this report?

A I'm the first author, but we both contributed approximately equally to it.

Q What does it mean that you're the first author?

A The names Matthew Turk and Mathias Kolsch up near the top are the authors, and my name is first there.

Q What is the significance of your name being first?

A I don't recall if there was a significance here.

Q In general, what is the significance of your name being first on documents like this?

A It depends on the document and its intended audience. In some cases, author names are alphabetical. In some cases, they indicate the amount of contribution -- contribution to the document. In some cases, they may indicate ordering of seniority.

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So it really depends on the context.

Q Do you remember why, for this document, Exhibit 1, your name is listed first?

A I don't remember.

Q When was Exhibit 1 published, approximately?

A Well, just going by the first page, it looks like 2003.

Q At a high level, what is Exhibit 1 about?

A It seems to be an overview of what we were calling "perceptual interfaces," talking about what the area is, what are some of the key problems, what are some key approaches, et cetera.

Q At a high level, what are the perceptual interfaces referenced by this document?

A At a high level, I would say they're multimodal interfaces, meaning multiple technologies or technologies that are perhaps primarily focused on different modalities of interaction, working together in a given system.

Q I'm going to ask you to turn to page 30. And typically today, when I refer to page numbers, it's going to be not the page numbers of the underlying

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document but rather the page number of the PDF.
So I'm going to ask you to turn to page 30 of the PDF. That rule may not always hold true, but that'll be the default today, I think. Is that okay?
A Yes.
Q Okay. And I actually got the page number wrong. I should have said 32.
Will you turn to page 32 of the PDF, please, which is page 30 of the underlying document.
A Okay.
Q On page 32 of Exhibit 1, there's a section at the bottom titled "Brain-Computer Interfaces." Do you see that?
A Yes.
Q What's this section about generally?
A I haven't looked at this section for many years, but I think, broadly, it's about this area of trying to understand human interaction by measuring aspects of the brain, which, for example, on the next page, EEG is mentioned as one of those things that may be measured to determine something about the brain activity of a user.

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Q Exhibit 1, would you turn to page 33 of the PDF, please?
A Yes.
Q On that page, the last full paragraph starts, "Since the human brain." Do you see that paragraph?
A Yes, I do.
Q Would you read that paragraph to yourself, please, and let me know when you're done?
A Okay. I'm done.
Q I'm going to ask you about the first sentence. And I'll read it. The first sentence says:
"Since the human brain is a very effective and highly adaptive controller, adaptation on the third level means to benefit from the combined resources of the two adaptive entities brain and BCI."
Did I read that right?
A I think so, yes.
Q What does that sentence mean?
A I don't really recall the specific purpose of this sentence in the context of this document.

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But just looking at it, top of my head right now, it's at least talking about how humans can adapt quite a bit to interfaces, in particular, to interfaces that engage the brain.
Q What does it mean that "the human brain is a very effective and highly adaptive controller"?
A Again, since I wrote this about -- around 23 years ago and haven't looked at it for a long time, I don't recall exactly what I meant in writing that.
But looking at it right now, I think it means, at least, that humans -- and fundamentally because of their brain processing -- can adapt to a wide variety of things.
Q Why did you and your coauthor in this paper describe the human brain as a controller?
A I don't remember.
Q What's a controller?
A Do you mean in general or in the context of this paper?
Q Both.
A In general, I don't think I have a good definition at the tip of my tongue right now.

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But in this context right here, it seems to be referring to being able to detect and exploit information. But, frankly, I don't remember specifically what I meant by "controller" here. It's been a long time.
Q In the context of computer science, what's a controller?
A I'm not aware that there's a particular definition of "controller" that's clear and agreed upon in computer science.
Q What's a controller in the context of video processing?
A I'm not sure that there would be a definition, in general, in that context. I think it would depend on the context specifically.
Q You can close that document. We're done with it. We might come back to it, but we're done with it for now.
(Deposition Exhibit 2 was marked for identification.)
BY MR. BUERGI:
Q We're going to move on to our next exhibit,

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which is going to be Exhibit 2. And this time, I've put in the file name "Exhibit 2" so you don't have to do it. And I've uploaded that to the chat window.

Would you download Exhibit 2, please, and let me know when you are done?

A I have it open.

Q Exhibit 2 is US Patent No. 6,125,371. Do you see that?

A Yes, I do.

Q And this is a patent where the first named inventor is Philip Bohannon, B-o-h-a-n-n-o-n.

Do you recall ever seeing this patent before?

A It doesn't look familiar, so I don't recall seeing it.

Q Would you turn to page 7 of the PDF, which will show you column 4 of the patent?

A Okay.

Q In column 4 at line 47, there's a paragraph that starts "Version manager 100." Do you see that paragraph?

A Yes, I do.

Q Would you read that paragraph to yourself, and

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then I'll ask you a couple questions on it?

A Okay.

Q In the middle of that paragraph that starts at column 4, line 47, there's a sentence that says:

"Those skilled in the art should be familiar with the use of controllers in processing environments generally and, more specifically, with main memory databases."

Do you see that sentence?

A I do, yes.

Q The next sentence says:

"Controllers may be implemented in software, firmware, hardware, or some suitable combination of at least two of the three."

Do you see that sentence?

A I do, yes.

Q Do you agree that controllers may be implemented in software, firmware, or hardware?

A Well, I don't know the context of this patent and what else it has said about version managers or controllers or memory or databases up to this point.

So I'm not really sure how to interpret that sentence out of context. It looks like the field of the invention is in database management systems, which is not necessarily a specific area of expertise for me.

So I'm not sure I have any comment about that sentence in particular.

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Q In the context of processing environments, do you agree that controllers may be implemented in software, firmware, or hardware?

A Context of processing environments.

Can you explain what you mean by that?

Q In the context of video processing, do you agree that controllers may be implemented in software, firmware, or hardware?

A It's not a question I've thought about before, but -- and I think it would perhaps depend on the details of that context. But, in general, broadly, I think that would be the case. I think I would agree with that.

Q You can close that document.

I'm going to upload to the chat room now

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Exhibit 3.

(Deposition Exhibit 3 was marked for identification.)

BY MR. BUERGI:

Q Would you please download Exhibit 3 and tell me when you have done so?

A I have it open.

Q I don't expect you to have seen this before, but maybe you have because you mentioned AI earlier.

Have you seen Exhibit 3 before?

A If I have, I don't remember it.

Q Okay. Exhibit 3 is an excerpt of "AI Magazine" from the winter of 2004.

And the excerpt includes an article titled "Model-Based Computing for Design and Control of Reconfigurable Systems." That's on page 3 of the exhibit. Do you see that?

A Yes, I do.

Q On page 3 of Exhibit 3, in the right-hand column, about ten or so lines down, there's a sentence that starts "The system controller for a reprographic system."

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Do you see that sentence?
A Sorry. Which page?
Q Page 3 of the PDF, which is page 120 of the underlying document. And then in the right-hand column, about ten lines down, there's a sentence that starts "The system controller for a reprographic system."
A I see that, yes.
Q Okay. I'll read the sentence. It says:
"The system controller for a reprographic system is the most challenging piece of software in the machine."
Did I read that right?
A Yes.
Q Do you understand this sentence to say that the system controller is a piece of software?
A Well, I guess I don't understand the sentence because I don't know what a reprographic system is.
Q You don't have an understanding of what a reprographic system is; is that right?
A That's right.
Q Setting that aside, does the sentence, to you,

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seem to be describing a controller that is a piece of software?
A That sentence does seem to be saying something about a controller that is a piece of software, but I don't know what the context of this is.
And it seems to be about high-end printers and photocopiers, which I am not an expert on.
Q You can close that document.
(Deposition Exhibit 4 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the chat Exhibit 4.
Would you download that, please, and let me know when you're done?
A I have it open.
Q Exhibit 4 is a paper titled "Designing the Control Architecture for Algorithm Specific Custom Processors on FPGAs." Do you see that?
A Yes.
Q What's an FPGA?
A An FGPA is a field programmable gate array, I believe.

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Q I think you may have said "FGPA," but you meant to say "FPGA," right?
A That's right. FPGA. Thank you.
Q If you go to page 2 of Exhibit 4, which is page 8 of the underlying document, in the left-hand column, you'll see that there's two sets of bullet points near the top of the column.
Do you see those two sets of three bullet points?
A I do, yes.
Q I'm going to ask about the second set of bullet points.
Do you want to read through those briefly, and I'll ask you questions about them, then?
A You said the second set?
Q Yes. They're introduced with a sentence that says:
"An explicit software controller is more appropriate..."
A Okay.
Okay.
Q The sentence introducing those three bullets

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says:
"An explicit software controller is more appropriate for controlling a custom serial processor because it:"
And then it lists the three bullets. Do you see that?
A I do see that, yes.
Q What's your understanding of what a software controller is?
A I don't think I have any understanding of what this software controller is in this context of custom processors on FPGAs, which is not an area of expertise for me.
Q Generally, what's your understanding of what a software controller is?
A I don't know that I have a general understanding. I guess I would interpret that in context.
Q Do you have any understanding of what a software controller is?
A Like I said, I don't think I have a general understanding. I think I would interpret it in context.

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Q Would you interpret this sentence of Exhibit 4 to be referring to a controller that is software?
A Well, not having seen this document before and not being an expert in this particular focused area -- I'm just going from the words on the page, but those words do mention a software controller. So I think, I guess, yes.
Q Still looking at page 3 of Exhibit 4, and still looking at the second set of bullet points in the left-hand column, the first bullet point starts "Uses the same functional units." Do you see that?
A First you said "page 3," but I thought we were looking at page 2.
Q Yep, you're right. Thank you for the correction. And I apologize.
Page 2 of Exhibit 4, which is page 8 of the underlying document in the left-hand column. If you look at the second set of bullet points, the first bullet point starts with "Uses the same functional units." Do you see that?
A I do, yes.
Q And the first sentence of that bullet point

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says:
"Uses the same functional units, but schedules these through a sequence of instructions defined in software."
Do you see that?
A I do see those words, yes.
Q Do you understand that to mean that the software controller that is referenced in the sentence preceding uses instructions defined in software?
A I could imagine that it means that. But, again, I don't really understand this document, as I've not looked at it before and don't know the area too well. But at least based on the words, it seems to be referring to that.
Q You can close that document. Let's look at one more exhibit, and then we'll take a break.
I'm uploading to the chat window Exhibit 5.
Would you download that, please, and let me know when you have done so?
(Deposition Exhibit 5 was marked for identification.)
THE WITNESS: Okay. I have it.

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BY MR. BUERGI:
Q Exhibit 5 is an excerpt of "Popular Mechanics" magazine from 2006. Do you see that?
A Yes.
Q Did you ever read "Popular Mechanics" magazine?
A I've probably seen it on bookshelves, but I'm not sure that I've ever read it.
Q Maybe while waiting in a doctor's office like I have?
A Could be.
Q Okay. Exhibit 5 is an excerpt that includes an article that starts on page 3 of the PDF. And the title of this article is down on the left. It's titled "Drive Safe." Do you see that?
A Yes.
Q I think that's the title of the article, and it's -- I think it's a recurring column with the name "Tech Clinic" which is why it says "Tech Clinic" at the top. Does that make sense?
A That makes sense.
Q If you scroll through this article -- and feel free to scroll through it if you want. But on page 5 of

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the exhibit, there's a column on the right. And the first full paragraph starts "In the current version of Windows XP." Do you see that paragraph?
A Yes.
Q Do you remember Windows XP?
A Vaguely, I do.
Q Did you use Windows XP?
A Yes, I believe I did for a while.
Q What is your understanding of what Windows XP is?
A Windows XP was an operating system developed and sold by Microsoft.
Q Was Windows XP software or hardware?
A It was software that would run on hardware.
Q Staying on that same page of Exhibit 5, page 5, and looking at that paragraph that starts "In the current version of Windows XP," second sentence says:
"The newer USB software controller within XP has write caching disabled..."
And then it goes on. Do you see that sentence?
A I do, yes.
Q Do you see that sentence refers to a software

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controller?
A In the context of hard drives, yes, I do see that.
Q Do you have an understanding of what a software controller is in the context of this exhibit?
A Not particularly. I'm not an expert in how hard drives are designed. So I don't really know specifically what their controllers do.
Q Does this paragraph on page 5 of Exhibit 5 seem to be describing a controller that is software?
A It seems to be, based on those words there.
Q Why do you say that?
A Because it uses the word "software controller."
Q Do you see it also refers to the software controller being within XP?
A I see that, yes.
Q Does that further indicate to you that the controller is software, because it's within Windows XP?
A It sounds kind of redundant to me since it says "software controller." So I'm not sure that necessarily causes it more so to be software.
Q Because it's already software by use of the

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word "software"? Is that what you're saying?
A That's what the words say, yes, "software controller."
Q In the context of video processing, does a controller require hardware?
A I'm not sure that I have a -- that there is a clear sense of what a software controller is specifically. I think it depends on the -- the specific context. So I'm not sure.
Q In your answer, you refer to a software controller. So let me -- let me repeat my question just to make sure you heard it right.
In the context of video processing, does a controller require hardware?
A Yeah, I think I misspoke. I think any controller in an area like image -- video processing or image processing, for me, would need to be stated specifically to be able to say what it must have or must be like or anything about it.
Q Have you ever worked on software controllers?
A I don't recall working on anything that was specifically called a "software controller."

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Q Have you ever worked on a controller that was software?
A Same answer. I don't recall anything like that.
Q Is it your opinion that a controller in the context of video processing requires processing circuitry?
A I believe it would -- it would depend on the context and what that controller is referring to in that context.
Q In what context, if any, would a controller require processing circuitry, in your opinion?
A I think generally a context that makes that apparent somehow, but I can't list all of the ways in which it might do that.
Q In what context would a controller not require processing circuitry, in your opinion?
A It's not something that I've particularly thought about, so I don't really have an opinion on it at the moment.
Q In what context could a controller be software, in your opinion?

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A I don't think I have an opinion on specific context in which that could be the case.
Q In the context of video processing, can a controller be software?
A I think that would depend on the particular context. So, in general, I'm not sure.
Q You agree, though, that, in at least some contexts, in the context of -- strike that.
You agree, though, that, in the context of video processing, a controller could be software in some cases; is that fair?
A I imagine that if, in such a context, that context made it clear that a software controller was an option or possible, then, yes, I guess it would be an option or possible in that context.
Q Are you aware of any reason that a controller cannot be software in the context of video processing?
A I'm not aware of that in general. I think it would depend on the specific context.
MR. BUERGI: Okay. We've been going for a little over an hour, so let's take a break.
///

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(Recess taken from 9:50 a.m. to 9:59 a.m.)
BY MR. BUERGI:
Q Dr. Turk, welcome back.
A Thank you.
Q Did you speak to Mr. Kelly or Mr. Sigmon during the break?
A No, I didn't.
Q Did you speak to anyone about the substance of your testimony during the break?
A No, I didn't.
(Deposition Exhibit 6 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the chat window Exhibit 6. Would you please download that and let me know when you have done so?
A Okay. I have it.
Q Exhibit 6 is a printout of a Web page from the Sony website. I printed this, as the date on the top left indicates, on May 27th of this year. And the URL is at the bottom.

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Do you see that, Dr. Turk?
A I do, yes.
Q I assume you're familiar with Sony. Is that fair?
A Yes, in general.
Q Okay. At the top of Exhibit 6, do you see it refers to "Support" and "Sony Support"?
A Yes.
Q Exhibit 6, do you see there's a question at the top that says:
"What is a pixel and how does it form a picture?"
Do you see that?
A Yes.
Q At the top of Exhibit 6 on the first page, there's a paragraph, and the first sentence says:
"A pixel, short for 'picture element,' is the unit of measurement for the size and quality of a digital image or display."
Did I read that right?
A Yes.

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Q Do you disagree with any part of that sentence?
A No, I don't.
Q Okay. You can close that document.
(Deposition Exhibit 7 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the e-room Exhibit 7. Would you let me know when you have that downloaded, please?
A I have it.
Q Exhibit 7 is an excerpt from the "Dictionary of Computer Vision and Image Processing." And the copyright date that you can see on the second page is 2005. Do you see that?
A Yes.
Q Now, this excerpt from the dictionary on page 3 of the PDF, which is page 218 of the dictionary, has its definition for the word "pixel." Do you see that?
A I do, yes.
Q And that definition starts with the following sentence:
"The intensity values of a digital

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image are specified at the locations of a discrete rectangular grid; each location is a pixel."
Did I read that right?
A Yes.
Q Do you think that sentence -- strike that. Do you disagree with that sentence in the definition of "pixel" for any reason?
A I don't disagree with the sentence. I would not characterize it -- characterize it as "the" definition of "pixel." There are different definitions of "pixels."
Q Do you have a definition of "pixel"?
A Not off the top of my head.
Q Are you aware of ever having provided a definition of "pixel"?
A I probably have in courses that I've taught, but I don't recall specifically.
Q Do you think in Exhibit 7 the sentence that I read from the definition of "pixel" is incorrect in any way?
A No, I don't think it's incorrect. Again, I

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just -- it's not the only definition of "pixel," but I wouldn't call it incorrect.

Q You can close that document.

(Deposition Exhibit 8 was marked for identification.)

BY MR. BUERGI:

Q I'm uploading to the e-room Exhibit 8.

Would you please download that and let me know when you have it?

A Okay. I have it.

Q Exhibit 8 is a document from ISO.

Do you have an understanding of what ISO is?

A Yes, I do. I forget what it stands for. International something -- International Standard Organization, perhaps. But, yes, in general, I've -- I know it.

Q What's your general understanding of what ISO is?

A I haven't thought about ISO for quite a while, but I believe it's a standards body, international standards body.

Q This document, Exhibit 8, refers to ISO 18383.

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Is it your understanding that that's the standard number?

A I'm not sure what you mean by "the standard number."

Q Is it your understanding that ISO 18383 refers to a standard from ISO?

A I see. Yes, I -- that's my understanding.

Q Have you seen this standard before?

A It's possible I have. I don't recall at the moment, though.

Q I should read the title of this standard for the record. The title of this standard, Exhibit 8, is "Digital Imaging -- Specification Guideline for Digital Cameras." Do you see that?

A Yes.

Q And this is the second edition from 2025. Do you see that?

A Yes.

Q If you scroll to page 8 of this exhibit, that is, page 8 of the PDF, which is page 2 of the underlying document, it has a Section 3.2 titled "Terms in pixel related specifications." Do you see that?

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A I do, though, in my version, both the PDF and the document say page 2.

Q Yeah. It -- my PDF viewer actually says both page 2 and 8, so I guess that raises some ambiguity. But page 2 of the underlying document has Section 3.2 in it. Do you see that?

A I do, yes.

Q Okay. If you go to the next page, which is going to be page 9 of the PDF and page 3 of the underlying document, it's going to have a Section 3.2.11. Do you see that?

A Yes.

Q And it says the word "pixel" there. Do you see that?

A Yes, I do.

Q That section describes a pixel as:

"Contraction of picture element, smallest geometric unit of information in a digital representation of an image, corresponding to a single spatial sample."

Did I read that right?

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A Yes.

Q Do you disagree with any part of that description of a pixel?

A No, I don't.

Q When that description refers to a "digital representation," do you have an understanding of what that means?

A I have an understanding of what a digital representation means, yes.

Q What is that understanding?

A It typically means representing information at discrete locations and can also mean representing the information in digital values.

Q What do you mean when you say "digital values"?

A Values that are quantized based on the number of bits in the digital representation.

Q How is a pixel a digital representation of an image?

A You're asking how. Do you mean the process by which it becomes so or -- can you clarify your question, please?

Q What does it mean for a pixel to be a digital

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representation of an image?
MR. KELLY: Objection. Form.
THE WITNESS: It can mean both of the things that I mentioned in terms of a specific location in an image and also represented by a digital value.
BY MR. BUERGI:
Q In your own words, how would you explain to someone the relationship between a pixel and a digital image?
A Well, as we've seen, there are different definitions or descriptions of the word "pixel."
And people can use it quite differently, but, in general, it's a -- with respect to a digital image, a pixel is a representation of the value of that image at a particular location --
Q Can you give an example of that?
A -- or something like that. Excuse me. Or something like that.
An example of that would be the video stream that I'm looking at right now that's showing me your face and others in this Zoom, any particular location, for example, X-Y, or row-column location in that image,

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has a value.
Q And how does that relate to a pixel?
A The pixel is the location in that representation that holds that value.
Q Okay. You can close that document if you like.
Earlier today, you testified that you consider yourself to be an expert in video processing; is that right?
A Yes.
Q Do you consider yourself to be an expert in signal processing?
A Generally, yes.
Q What's signal processing?
A Well, very broadly, it's the processing of signals. And there are many different kinds of signals that might be processed. And there are many different kinds of processing or purposes of the processing.
But, broadly, it's processing of signals.
Q What's a signal?
A I don't have a good definition of "signal" on the top of my head at the moment. But, loosely, it's information representing something.

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Q What's a video signal?
A I would say the particular definition or description of "video signal" depends a lot on the context, but, broadly, it means representing information about a video.
Q Do you consider yourself to be an expert in video signal processing?
A Yes, I do.
Q In that context, that is, the area in which you consider yourself to be an expert, what is a video signal?
A I don't think there's a -- one specific definition of "video signal" in that area. But, very broadly, it tends to refer to images presented over time.
Q Is -- can part of an image be a video signal?
A I think the most common way of considering that in the field would be that part of an image can be part of a video signal.
Q Why do you say that?
A Because I think that's what the field understands.

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(Deposition Exhibit 1001 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the chat window Exhibit 1001. And this is Exhibit 1001 from the IPR. It is the '645 patent.
Would you download that and tell me when you're done, please?
A Okay. I have it.
Q Do you recognize Exhibit 1001 as being the '645 patent?
A Yes, I do.
Q Have you reviewed the '645 patent?
A Yes.
Q Did you review the '645 patent in preparation for this deposition?
A Yes, I did.
Q Would you turn to the end where it has claim 1, please, which is at the bottom of column 24?
A Yes.
Q On line 55, do you see that claim 1 refers to:
"A corrector which corrects a video

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signal input to the input unit"?
MR. KELLY: Objection. Form.
THE WITNESS: Yes, I see that.
BY MR. BUERGI:
Q What's your understanding of what a corrector is?
A In this context, I think it's something that changes or modifies or corrects the video signal.
Q You said "in this context." What context are you referring to?
A What you just asked me to look at in claim 1.
Q When you said "in this context," did you mean the context of the '645 patent?
A I meant specifically the context of what you looked -- what you asked me to look at, at the '645 patent.
Q Well, can you be more specific?
A I don't think so.
Q Did you mean in the context of claim 1 of the '645 patent?
A I meant the context of the words you asked me to look at in claim 1.

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Q Okay. Understood.
Still looking at claim 1 in the '645 patent and its recitation of a "corrector," what's your understanding of what the structure of a corrector is?
A I don't recall offhand. I might have discussed that in my declaration, which we could go to if you like.
Q Just asking about your understanding of the patent and its claim 1.
A Yeah, I don't recall that offhand, so I would prefer to look at my declaration if we want to discuss that.
Q I'm uploading to the chat room your declaration, which is Exhibit 2017.
(Deposition Exhibit 2017 was marked for identification.)
BY MR. BUERGI:
Q And when your declaration was submitted in the IPR, there was an original version, and then later, there was a corrected version. This is the corrected version.
So would you download that and let me know when you're done, please?

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A Okay. I have it.
Q Do you recognize Exhibit 2017 as your declaration?
A Yes, I do.
Q Okay. Feel free to refer to your declaration if it helps you answer. I'll ask the question again.
In the context of claim 1 of the '645 patent, what's the structure of a corrector?
A As I discussed in my declaration in paragraph 81, I considered the structure of the corrector -- one of the things I considered for the construction of the corrector was a CPU or equivalence.
Q Are you done with your answer?
A Yes.
Q Is the -- is that structure that you referred to in paragraph 81 the structure that is implied by the word "connector"?
A I'm not sure that it's necessarily implied, but I don't find it unreasonable.
Q What structure would the term "connector" imply to a person of skill in the art of the '645 patent?

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MR. KELLY: Objection. Form.
THE WITNESS: I'm not aware that it would necessarily imply a structure.
BY MR. BUERGI:
Q In what context would it imply a structure?
A Well, it could state the structure, which is more than implying; otherwise, I think it just kind of depends on the context.
Q In the context of video processing, what structure is implied by the word "corrector"?
A That's a very broad context, so I'm not sure if it would imply anything in particular.
Q Does the word "corrector" imply a class of structures?
A Not that I'm aware of.
Q Have you offered an opinion on that topic?
A I don't recall.
Q Sitting here today, with your declaration in front of you, are you aware of opining on whether the word "connector" [sic] implies a structure --
MR. KELLY: Objection. Form.
///

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BY MR. BUERGI:
Q -- to a person of skill in the art?
A Sorry. You said "connector." Are we speaking of a connector or a corrector?
Q I'm sorry. I meant to say "corrector." I can ask again.
A Please.
Q What structure does the term "corrector" imply to a person of skill in the art?
A I think it would depend on the context.
Q In the context of the '645 patent, what structure does the term "corrector" imply to a person of skill in the art?
A I don't recall it implying anything in particular about the structure.
Q Does it imply anything, in general?
A About the structure? Not that I am aware of -- not that I recall.
Q And have you offered an opinion on that topic?
A I don't recall offering an opinion specifically on that.
Q Can the digital signal processor be a

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corrector?
A In the context of the '645 patent, I think it could.
Q Could a CPU be a corrector?
A I think it could.
Q Could a piece of software be a corrector?
A Perhaps it could.
Q Why do you say "perhaps"?
A I don't recall analyzing specifically if a piece of software could be a corrector or opining on that in my declaration.
Q Could a piece of firmware be a corrector?
A Again, I don't recall considering that or forming an opinion of that necessarily, but perhaps it could.
Q What other things could be a corrector?
A I don't know.
Q Is there a typical implementation of a corrector in the field of video processing?
A Not that I'm aware of.
Q What are some example implementations of correctors in the field of video processing?

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A I don't have any particular examples in mind, so I'm not sure.
Q Can you identify for me any example of a corrector in the field of video processing?
A Well, the '645 patent has a corrector.
Q Any others?
A Not off the top of my head.
Q What's the structure of the corrector in the '645 patent?
A I don't recall whether the patent specifies a structure or not.
Q Have you offered an opinion on that topic?
A I don't recall offering an opinion on that, but if there is one in my declaration, you could point me to it.
Q New topic. Would you look at the '645 patent, please?
A Yes.
Q In the '645 patent, if you go to column 20 on line 12 approximately, there's a heading that says "Fourth Embodiment." Do you see that?
A Yes, I do.

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Q And that section continues for a few columns until we reach the claims. Do you see that?
A Yes.
Q Okay. In the '645 patent, in column 24, there's a paragraph that starts at line 10. It starts "In figure 37." Do you see that?
A Yes.
Q You understand this section of column 24 to be part of the fourth embodiment; is that right?
A Yes, I believe so.
Q In column 24, at line 14, there's a sentence that says:
"As a result, for example, it is possible to exclude the pattern portions and conduct correction only in the contents display area."
Do you see that sentence?
A Yes, I do.
Q In your own words, what do you understand that sentence to mean?
A I think it's describing part of this fourth embodiment description where the contents of the image

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can be determined. And that information can then be used to exclude -- or, sorry, to conduct correction only there.

Q When you say "only there," what do you mean?

A In that frame, only in the area where there's content.

Q And what happens, as you understand it, in the area that is not content?

A In this particular embodiment, in this description, where there's not content, there's not correction done.

Q In the '645 patent, would you turn to column 16, please?

In column 16 at line 5, do you see there's a heading titled "Third Embodiment"?

A I see that.

Q And do you understand the third embodiment to extend from that point in the specification all the way to column 20, line 10 where it then has the heading "Fourth Embodiment"?

A Yes.

Q Okay. Let's talk about the third embodiment.

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In column 19 -- strike that.

You understand column 19 to be part of the third embodiment; is that right?

A Yes.

Q Okay. In column 19 at line 64, there's a paragraph that starts "In the present embodiment." Do you see that?

A Yes.

Q That sentence says:

"In the present embodiment, the case where the picture quality enhancement processing is stopped in response to the detection of pattern portions has been described."

Do you see that sentence?

A Yes.

Q In your own words, what do you understand that sentence to mean?

A I think it's describing the third embodiment text above that and talking about the description, about not doing the picture quality enhancement processing if there is a pattern portion in that frame.

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Q That sentence in column 19, line 64, refers to detection of pattern portions.

What was happening before the detection of pattern portions?

A Before in this description? Or what do you mean by "before"?

Q In the sentence, yes, in that description.

A I'm not sure I understand the question. In that sentence, what comes before the detection of pattern portions?

Q In that sentence at column 19, line 64, was picture quality enhancement processing occurring before the detection of pattern portions?

A In prior frames, it was, yes.

Q Is picture quality enhancement processing a type of correction?

A Yes, I think it's a type of correction.

Q Still looking at that sentence in column 19, line 64, in your own words, what do you understand it to mean when it says:

"...picture quality enhancement processing is stopped"?

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A In general, the system may have been doing picture quality enhancement processing in previous frames. But for this frame, it's not doing that because pattern portions have been detected.

Q Still looking at the sentence in column 19, line 64, in your opinion, would it be fair to say that that sentence is describing that the system was correcting the video and then stopped?

A Yes. Like I said, in prior frames, it was correcting the video, correcting those frames. And then that stopped.

Q Let's turn now to a few sentences before that, column 19, line 59. There's a paragraph -- I'm sorry -- there's a sentence on line 59 that says:

"If a pattern portion is contained, the picture quality enhancement processing for the video signal is stopped."

Do you see that sentence?

A Yes.

Q In your own words, what do you understand that sentence to mean?

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A It means that the enhancement that was being done in previous frames is no longer being done when a pattern portion is detected for the current frame.
Q Is it fair to say that the sentence in column 19, starting at line 59, is describing that the system was correcting the video signal but then stopped correcting when it detected pattern portions?
A Yes. And most specifically was correcting for previous frames and is not correcting the frame in which it detected pattern portions.
Q The '645 patent, in column 13, at line 11, or maybe 12, do you see there's a heading that said "Second Embodiment"?
A Yes.
Q And in column 3 at line 46, roughly, do you see there's a heading titled "First Embodiment"?
A Yes.
Q And we previously looked at the headings titled "Third Embodiment" and "Fourth Embodiment," right?
A That's right.
Q And I don't think there's a heading that says "Fifth Embodiment."

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Is that your understanding too?
A That's my understanding.
Q Okay. So, to summarize, it's your understanding that the '645 patent has four embodiments that it enumerates using headings; is that fair?
A Yes, it is.
Q And if I refer to those as the first embodiment and the second embodiment and the third embodiment and fourth embodiment, will you understand that I'm referring to those enumerated embodiments?
A Yes, I understand that.
Q Okay. In your opinion, do the patent's claims cover all four of the named embodiments?
A They don't cover every aspect of all four embodiments, no.
Q Why do you say that?
A Because they don't.
Q Can you be more specific?
A I would have to go through all of the details of the embodiments. But I'm fairly certain it is the case that there are many of those details that are not -- or at least there are some of those details that are not mentioned in the claims.
Q You're saying that the embodiments, as set forth in the specification, have details that are not necessarily reflected in the claims; is that fair?
A That's fair, yes.
Q Okay. In your opinion, are any of the -- strike that.
In your opinion, do any of the '645 patent's claims exclude any of the four named embodiments?
A I don't believe the claims explicitly exclude any complete embodiment.
Q In your opinion, are any of the four enumerated embodiments not covered by the claims?
A I would have to check. I don't recall any of the four embodiments being completely excluded from the claims, but I would need to double-check on that.
Q What would you double-check?
A The claim language itself and where things are described in the specification relating to that claim language.
Q Do you have an opinion on whether the third or fourth embodiments, in particular, are covered or not

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covered by the patent's claims?
MR. KELLY: Objection. Form.
THE WITNESS: I would -- I would say that it really depends on the specific claim or claims. The claims don't talk about embodiments specifically or explicitly, so it depends on the claim.
BY MR. BUERGI:
Q If we look at claim 1, do you have an opinion on whether the patent's third and fourth embodiments are encompassed within the scope of claim 1?
A I'm not sure that any particular embodiment is encompassed in any particular claim. At least they don't state that explicitly. So I'd have to go and check, element by element, if certain things are part of certain embodiments, to answer.
Q Have you done that analysis?
A I have done it generally. I don't recall to what amount of detail. But, in general, I have, yes.
Q Having done that analysis, can you tell me whether the third and fourth embodiments are encompassed within the scope of claim 1?
MR. KELLY: Objection. Form.

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THE WITNESS: Off the top of my head, I don't recall all the specific details of that. But I do believe there are aspects, in particular of embodiment 4 that are not in claim 1.

BY MR. BUERGI:

Q If I asked you about independent claims 3 and 5, would you give me the same answer?

A I think I would give you about the same answer. And, again, I would have to go through the claims and their limitations and compare them to the embodiments specifically to be precise about that. And I don't have all that information on the top of my head.

Q Is that information in your declaration?

A I don't believe I listed it specifically, although I don't recall for sure.

Q If you scroll through your declaration now, would you please tell me if you think you've offered an opinion on whether the third or fourth embodiments are or are not covered by any of the claims?

MR. KELLY: Objection. Form.

THE WITNESS: So I'm looking through -- in perusing my declaration quickly, it seems like I discuss

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here and there various aspects of some of the embodiments.

Only maybe a couple places or so do I mention also claims with respect to that. But I don't believe I say anywhere that -- what a direct relationship between claims and embodiments are.

BY MR. BUERGI:

Q Have you offered an opinion in your declaration, as far as you can tell, that the claims do or do not cover a third embodiment or the fourth embodiment?

MR. KELLY: Objection. Form.

THE WITNESS: I do recall seeing at least a bit related to that. For example, in paragraph 85 of my declaration, on page 37, in the lower part, I say:

"The '645 Patent does" not "discuss other approaches to this process (such as in the fourth embodiment which is more complex at least in that it addresses patterns that may or not be wallpaper portions), but a POSITA would recognize that those other approaches

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are not what the claim language is referring to."

So that's one mention related to embodiment 4 in claim language.

In paragraph 88 on page 41, I say:

"In this case, claim 5 in some ways acts as a hybridization of the third embodiment and the fourth embodiment: If (1) pattern portions are not contained or (2) the pattern portions are contained and are no-picture areas, then correction occurs."

So there's another place where I'm mentioning embodiments and a claim. There might be others, but I don't recall them.

Q In paragraph 88 of your declaration, what do you mean when you say "a hybridization of the third and the fourth embodiments"?

A In general, I think I meant that there are aspects of the third embodiment and the fourth embodiment in claim 5.

Q Are there aspects of the third and fourth

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embodiments in claim 1?

A I don't recall commenting on that in my declaration. But, on the top of my head, I don't think there's anything in claim 1 that's exclusive to embodiment 4.

Q What do you mean when you say you don't think there's anything in claim 1 that's exclusive to embodiment 4?

A Well, that's what I mean, those words. I'm not sure how else to explain it.

Q Are you saying that, in your opinion, claim 1 doesn't describe any aspect of the fourth embodiment that's not also in the third embodiment?

MR. KELLY: Objection. Form.

THE WITNESS: I don't think claim 1 includes anything that claim 4 has -- sorry, excuse me -- that embodiment 4 has that the other embodiments don't have.

BY MR. BUERGI:

Q Do you think claim 5 acts as a hybridization of the third and fourth embodiments?

A Generally, yes.

Q I'm sorry. I meant to say "claim 3."

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Do you think claim 3 acts as a hybridization of the third and fourth embodiments?
A I haven't thought about that before, but I don't see anything that would necessarily lead me to say that. But, again, I -- it's just off the top of my head.
Q Do you have an opinion on whether someone who is practicing the patent's fourth embodiment is practicing claim 1?
A I haven't actually analyzed that. And I would need to look through embodiment 4 precisely to look for the elements of claim 1. I'm not sure I want to give an opinion on that off the top of my head.
Q Do you have an opinion on a whether someone who is practicing the fourth embodiment is practicing claim 3?
A I would say the same answer. I haven't really analyzed specifically what claims the fourth embodiment practices.
Q Do you have an opinion on whether someone who is practicing the fourth embodiment is practicing claim 5?

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A Same answer. I just haven't analyzed that.
Q Do you have an opinion on whether someone who is practicing the third embodiment is practicing any of the claims?
A I would need to think through the aspects of that embodiment and the details of these claims to give you a precise answer. So off the top of my head, I can't answer that.
Q Did you perform that analysis in forming the opinions in your declaration?
A I certainly looked at the embodiments and looked at the claims and the claim language and opined on certain things that we've already discussed related -- relating the two.
I don't recall if I gave opinions on if any claims are practicing any particular embodiments or vice versa.
MR. BUERGI: Let's take a break.
THE WITNESS: Okay.
(Recess taken from 11:07 a.m. to 11:18 a.m.)
///

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BY MR. BUERGI:
Q Dr. Turk, welcome back.
Did you speak to anyone during the break about your testimony?
A No, I didn't.
(Deposition Exhibit 1004 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the chat window Exhibit 1004 from the IPR, which is the Kim prior art reference.
Would you please download that and tell me when you have it?
A Okay. I have it.
Q Do you recognize that exhibit as the Kim prior art reference?
A Yes, I do.
Q Did you review this reference?
A Yes.
Q Excuse me. Sorry.
Is it okay with you if I refer to the Kim prior art reference as "Kim"?
A Yes, it is.

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(Deposition Exhibit 1005 was marked for identification.)
BY MR. BUERGI:
Q I'm uploading to the chat window Exhibit 1005, which is the Fujimura prior art reference from the IPR.
Would you download that, please, and tell me when you have it?
A Okay.
Q Do you recognize Exhibit 1005 as the Fujimura reference?
A Yes, I do.
Q Have you reviewed the Fujimora reference?
A Yes.
Q Is it okay with you if I refer to the Fujimura reference as "Fujimura"?
A Yes.
Q Okay. I have a small module of questions where I might ask about both together, so that's why I introduced them both together.
But let's start with Kim. And if you look at paragraph 1 in Kim, it's under a heading that says "Field of the Invention." Do you see that?

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A Yes.
Q And the first sentence of paragraph 1 in Kim refers to "video signal processing." Do you see that?
A Yes, I do.
Q In Kim paragraph 1, in the bottom half, there's a sentence that starts "Examples of applications of the present invention." Do you see that?
A Yes.
Q That sentence says that:
"Examples include, but are not limited to, contrast enhancement and color enhancement..."
Do you see that?
A Yes.
Q Okay. If you look at Fujimura now, Exhibit 1005, and you go to column 1 of the first paragraph, it's under a heading titled "Background of the Invention." Do you see that?
A Yes.
Q The first sentence in column 1 says:
"The present invention relates to a contrast enhancer for enhancing the

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luminance contrast and color-saturation contrast of a video signal in a television receiver, video tape recorder, or other video apparatus."
Do you see that sentence?
A Yes.
Q Now, keeping both Kim and Fujimura in mind at the same time, would you agree that both Kim and Fujimura address contrast enhancement in video?
A In general, yes.
Q Would you agree that both Kim and Fujimura relate to video processing?
A Yes.
Q Would you agree that both Kim and Fujimura are in the same field?
A I think broadly, yes.
Q Let's -- you can set Kim aside if you want, and let's focus on Fujimura for a little bit.
Like to turn your attention to column 14 in Fujimura, which describes, in large part, its figure 19. Do you see that?
A Yes, I do.

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Q You reviewed this column in Fujimura, right?
A Yes.
Q You understand column 14 in Fujimura to be generally describing the detection of where letterbox bands begin and end?
A Generally, yes.
Q What's your understanding of what letterbox bands are?
A In Fujimura, there are black areas at the top and the bottom of an image that are there because of aspect ratio matching between an original signal and a display device.
Q In your answer, you said "in Fujimura."
But is that description also fair for letterbox bands outside of Fujimura?
A I think the description would be more broad for other applications or for a range of applications.
Q What's your understanding of letterbox bands generally?
A Most typically, they are used as I just described for Fujimura or, also, to be put on the left and right of an image, again, usually for aspect ratio

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issues, but there can be design issues as well involved in letterboxing.
Q What type of design issues?
A Someone who's creating video might put letterboxes in their -- at least for a portion, just because they like the look or it matches the content of the video or something else. But there might be other reasons too.
Q In Fujimura, column 14, line 7, there's a paragraph that starts "Figure 9 [sic] shows an example."
Do you see that paragraph?
A Figure 19, yes.
Q Yeah. Column 14, at line 7 refers to figure 19. Do you see that paragraph?
A Yes.
Q Would you read that paragraph to yourself and tell me when you're done, please?
A Okay.
Q Do you see that paragraph in column 14 at lines 10 to 11 refers to classifying each pixel as bright or dark based on its luminance level?
A Yes.

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Q What do you understand that to mean, in your own words?
A This is describing, for each image location -- for the luminance signal of each image location, a threshold is applied to that luminance signal, and it's determined whether that signal is bright or dark, essentially.
Q Would you drop down to column 14, line 19, please, which is the next paragraph down?
On line 19 there's a sentence that starts "The first horizontal scanning line." Do you see that?
A Yes.
Q I'll read the sentence. It says:
"The first horizontal scanning line in which the count exceeds the second threshold is regarded as the starting line of the picture area."
Do you see that?
A Yes.
Q What's your understanding of what that sentence is describing?
A When there are -- when there are an adequate

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number of pixels that have determined to be bright on a particular line, the first time that happens, that line is regarded as the beginning of the picture area vertically.
Q And in Fujimura, when it refers to the "picture area," that's not the letterbox bands, right?
A That's correct.
Q If we continue down column 14 and go to line 31, you see there, there's a sentence that says:
"The first line in which the dark-pixel count exceeds the third threshold is regarded as the end of the picture area, i.e. the first line of the lower non-picture band."
Do you see that sentence?
A Yes.
Q Do you understand that -- strike that.
Is it your understanding that the lower nonpicture band is the lower letterbox band?
A Yes.
Q Does that sentence in column 14, line 31 that refers to the dark-pixel count exceeding a third

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threshold allow for line of a letterbox band to include some bright pixels?
A Yes, depending on the threshold, but it can.
Q To state that question differently, does Fujimura -- does Fujimura allow the letterbox band line to include some bright pixels?
A Yes, it specifically mentions captions, for example.
Q What part of Fujimura are you referring to?
A In this column 14, also in column 13, it talks about the presence or absence of a caption. So there.
Q In Fujimura, when it talks about a caption, what do you understand that to be?
A I don't recall if Fujimura gives specific information or description about it, but I expect it's text in the bottom letterbox portion.
Q Would an example of such text be subtitles?
A I don't know if Fujimura mentions that. I don't recall. But I think that would be an example.
Q Would another example of captions in the letterbox band be closed captioning?
A I don't recall if Fujimura mentions that, but I

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think that would be a reasonable example.
Q What is closed captioning generally?
A As a consumer of video, I guess I consider closed caption as being text that is added to a movie or video stream to help the watch -- the person watching the movie or video understand what's being said.
Q Is there a difference between subtitles and closed captioning, in your opinion?
A I haven't thought about that. So I'm not sure if there is a difference.
Q Do you have an understanding of why it's called "closed captioning"?
A I don't know.
Q Okay. Grounding ourselves back in Fujimura, we were discussing that letterbox lines in the context of Fujimura could have a certain number of bright pixels and had an example of where that might happen is captions; is that fair?
A Yes.
Q What are other examples where letterbox bands might have bright pixels?
A In general, or in Fujimura specifically?

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Q Either.
A In general, letterbox bands can be designs that are not all bright or not all dark or not all the same values.
Q Is there an example of such letterbox bands that you know of?
A The '645 patent describes something similar to that.
Q Outside of the '645 patent, are you aware of examples of such letterbox bands?
A I think I've seen them, but I can't recall specifically in what context.
Q Can you think of another scenario in which letterbox bands might have bright pixels?
A We've already talked about captions. But beyond that, nothing comes to mind at the moment.
Q In Fujimura, in column 14 on line 1, there's a sentence that says:
"If a caption is present in the lower non-picture band..."
And it goes on.
Do you understand that that sentence to be

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describing captions that appear in a letterbox band?
A Yes, I do.
MR. BUERGI: Okay. Mr. Kelly, I pass the witness to you, if you have any questions.
MR. KELLY: Great. Can I take five minutes to confer?
MR. BUERGI: Of course.
MR. KELLY: All right. I'll be back in five.
MR. BUERGI: We can go off the record.
(Recess taken from 11:39 a.m. to 11:44 a.m.)
MR. KELLY: I'll start, if that's all right.
MR. BUERGI: Yes. We're on the record. Okay.
MR. KELLY: Uh-huh.

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EXAMINATION

BY MR. KELLY:
Q Thank you, Dr. Turk. Just a few questions on redirect. If I could ask you to turn to paragraph 60 in your declaration.
A Okay. I'm there.
Q So looking in paragraph 60, what do you

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characterize here as key features that make up your understanding of the third embodiment?
A I would say the key features are the detection of pattern portions in the signal, the picture quality enhancement circuit, setting correction data.
(Interruption by the stenographer.)
THE WITNESS: Setting.
I think those are the -- probably the key ones listed there, discussed there.
BY MR. KELLY:
Q So in the third embodiment, what happens when the pattern portions are detected?
A There's no correction done to the frame.
Q Okay. And if I could direct you to paragraph 61 right after that.
A I'm there.
Q What did you understand the differences between the fourth embodiment and the third embodiment to be?
A Well, the main ones are that it handles no-picture areas differently and distinguishes between pattern wallpaper areas and black no-picture areas and restricts the characteris- -- characteristic point

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detection only to the content display area excluding the pattern portions.
So the values of luminance and color histogram and things like that are calculated without being influenced by the no-picture areas. So --
Q So in the fourth embodiment -- oh, I'm sorry. I didn't mean to cut you off.
A Sorry. I'm just going to add so that the -- it can correct just the content portions of a frame.
Q Okay. Now, claim 1, Mr. Buergi had you take a look at that earlier. It includes a requirement that the controller caused the corrector not to correct the video signal when the pattern portions are contained.
Do you understand the third embodiment to meet this requirement?
MR. BUERGI: Objection. Leading.
THE WITNESS: Yes, the third embodiment does meet that.
BY MR. KELLY:
Q I'll rephrase the question as well.
Earlier, Mr. Buergi asked you if you had an opinion on whether the third embodiment met the

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limitations of the claims.
Do you have an opinion on that?
A Yes. Looking at this portion of my declaration, and recalling the other portions, it does make clear that the third embodiment does embody claim 1.
Q And similarly, earlier, Mr. Buergi asked you if you had an opinion on whether the fourth embodiment met the limitations of at least claim 1.
Do you have an opinion on that?
A Looking at this section in my declaration reminds me that it does not because of the language of claim 1 regarding the correcting or not correcting is different from what the fourth embodiment teaches.
MR. KELLY: I have no further questions.
MR. BUERGI: We can end the deposition.
THE STENOGRAPHER: Okay. Quickly, orders for the transcript.
Would you like -- oh, you said you wanted four-day delivery by Monday, Mr. Buergi?
MR. BUERGI: Please.
THE STENOGRAPHER: Okay. And do you need --

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MR. BUERGI: Would you send --
THE STENOGRAPHER: -- a rough draft?
MR. BUERGI: -- me a rough? I'm sorry.
THE STENOGRAPHER: No problem.
MR. BUERGI: You read my mind. Yes.
THE STENOGRAPHER: And Mr. Kelly?
MR. KELLY: We'll take it when it's available. It's his turn to reply.
THE STENOGRAPHER: So if they -- if they do his on an expedited basis, you would like yours expedited as well?
MR. KELLY: We are not rushing to get it. We'll take it when you're able to provide it.
THE STENOGRAPHER: Understood.
MR. KELLY: Standard processing is fine.
THE STENOGRAPHER: Do you need a rough draft?
MR. KELLY: No, I don't think so. Co-counsel was on the call today, so...
- - -
(The deposition concluded at 11:51 a.m.)

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WITNESS CERTIFICATION

CASE: SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA, INC. vs. MAXELL, LTD.
WITNESS: MATTHEW A. TURK, PH.D.
DEPOSITION DATE: July 21, 2026
JOB NO.: 639276

I, MATTHEW A. TURK, PH.D., having remotely appeared for my videoconference deposition on July 21, 2026, hereby certify under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.
IN WITNESS WHEREOF, I have hereunto subscribed my name this _____ day of _____ 20___, at _____, _____.
(city) (state)

_____
MATTHEW A. TURK, PH.D.

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DEPONENT'S CHANGES OR CORRECTIONS
Note: If you are adding to your testimony, print the exact words you want to add. If you are deleting from your testimony, print the exact words you want to delete. Specify with "Add" or "Delete" and sign this form.

DEPONENT: MATTHEW A. TURK, PH.D.
CASE: SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC. vs. MAXELL, LTD.
DEPOSITION DATE: JULY 21, 2026

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CERTIFICATE OF SHORTHAND REPORTER

CASE: SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA, INC. vs. MAXELL, LTD.

DEPOSITION DATE: JULY 21, 2026 JOB NO.: 639276

I, Marla Sharp, certified stenographic reporter licensed in California, Oregon, and Washington, do hereby certify that MATTHEW A. TURK, PH.D., the witness was duly sworn by me before the commencement of such deposition and that such deposition was taken before me and is a true record of the testimony given by such witness; that the adverse party, Maxell, Ltd., was represented by counsel at the deposition; that the deposition of MATTHEW A. TURK, PH.D., occurred remotely via Zoom on Tuesday, July 21, 2026, commencing at 8:54 a.m. to 11:51 a.m. PDT; that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and I am in no way interested, financially or otherwise, in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand July 27, 2026.

Marla Sharp

Marla Sharp, RPR, CLR, CCRR
CA CSR 11924, OR CSR 17-0446, WA CSR 3408