

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

Case: IPR2025-01312

-----X
SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.

Petitioners,

v.

MAXELL, LTD.,
Patent Owner
-----X

DEPOSITION

OF

DAN SCHONFELD

THURSDAY, MAY 7, 2026

HELD REMOTELY

Reported by:
Candida Borriello
Stenographic Court Reporter
Job No. 7122377-001

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

DATE: May 7, 2026

TIME: 10:02 a.m. (Eastern Time)

Deposition of DAN SCHONFELD, held
REMOTELY, before Candida Borriello,
Stenographic Court Reporter and Notary
Public of the State of New York.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

A P P E A R A N C E S:

Appearing on Behalf of Samsung Electronics
Co., LTD. and Samsung Electronics America,
Inc.:

DLA PIPER LLP (US)
845 Texas Avenue
Suite 3800
Houston, Texas 77002-5005
BY: ROBERT BUERGI, ESQ.
EMAIL: robert.buergi@dlapiper.com

Appearing on Behalf of Maxell, LTD.:

KELLDANN LAW, PLLC
6731 Whittier Avenue
Suite B-236
McLean, Virginia 22101
BY: SCOTT KELLY, ESQ.
EMAIL: scott@kelldann.com

1 D. Schonfeld

2 THE COURT REPORTER: We're on the
3 record.

4 D A N S C H O N F E L D,
5 called as a witness, having been
6 duly sworn by a Notary Public,
7 was examined and testified as
8 follows:

9 EXAMINATION BY

10 MR. KELLY:

11 Q. Good morning. Can you please state
12 and spell your name for the record?

13 A. Sure. My name is Dan Schonfeld,
14 D-A-N. Last name, S-C-H-O-N-F-E-L-D.

15 Q. Great. And where are you taking
16 the -- where are you giving this deposition
17 from today?

18 A. I am in Northbrook, Illinois.

19 Q. And let's talk about the nature of
20 your set-up. So are you in a home office or
21 is -- sorry. Are you in a home office or...

22 A. I don't know if you're finished
23 with or according to what I heard, so I don't
24 know if it's the end of the question or not.

25 Q. Where are you? What room are you

1 D. Schonfeld

2 in?

3 A. Yeah. I am in a home office.

4 Q. Great. And is there anybody else
5 in that room?

6 A. No.

7 Q. And how are you currently connected
8 to this deposition?

9 A. I am Wi-Fi connected through cable
10 modem, if that's what you're asking.

11 Q. Sorry. What sort of device are you
12 accessing this on?

13 A. Oh, I have a laptop and I have two
14 screens in front of me, so it's a laptop with
15 two screens. I'm looking sideways sometimes
16 because I'm between the two.

17 Q. And is there anybody else visible
18 to you on your screen?

19 A. There is. I don't know what you
20 mean by "else." Aside from the Zoom?

21 Q. Aside from Zoom, yes.

22 A. Visible at the moment is just an
23 Acrobat application empty at the moment. And
24 I also have on the separate screen, I don't
25 see it at the moment, the connection from

1 D. Schonfeld

2 Zoom is done through the Web in case I get
3 disconnected, I can connect quickly. And I
4 have access to certain electronic files that
5 I placed in case they're needed.

6 Q. Okay. But none of those files are
7 open right now?

8 A. No.

9 Q. And then are you maintaining any
10 communication channels such as a chat outside
11 of this Zoom?

12 A. There is no other channel or any
13 other communication channel ongoing.

14 Q. Okay. And are you capable of
15 reviewing documents that are shared through
16 the Zoom chat?

17 A. I am capable of downloading them
18 and then displaying them.

19 Q. Okay. Great. And that's how we'll
20 share our exhibits today.

21 Other than the computer that you
22 described, are there any other communication
23 devices in the room like a smartphone or
24 anything like that?

25 A. There is a smartphone, it's silent,

1 D. Schonfeld
2 it's on the side, and it's not off, but it's
3 silent. And I'm not using it, only during
4 the breaks.

5 Q. Great. So if I ask you to not use
6 that device to communicate with any people
7 who are in or out of this deposition during
8 this deposition; is that all right?

9 A. Yeah. I will only communicate
10 during breaks to the extent I communicate.
11 I put it on silent, and I will not use it at
12 all during the deposition.

13 Q. Okay. And then besides what's on
14 your screen, do you have any documents in
15 front of you?

16 A. Yeah.

17 Q. Or with you?

18 A. I do. I have hard copies that were
19 sent to me by counsel of the patent, of
20 patent at issue and the -- and my
21 declaration.

22 Q. Okay. And did they have any markup
23 on them?

24 A. I asked for clean copies and I
25 haven't looked. Let me take a quick look.

1 D. Schonfeld

2 Q. Okay. Is there any reason you
3 can't testify truthfully and accurately
4 today?

5 A. So just to complete my previous
6 response, I didn't see any markings in the
7 quick look that I took right now. And -- and
8 to address the current question, I am not
9 aware of any reason that I cannot answer
10 truthfully today.

11 Q. So as we have been doing so far and
12 as we'll continue, I will be asking
13 questions, I'm going to try to stop
14 interrupting you to make sure that I always
15 give you a chance to provide a full answer,
16 this way we'll have the best record in the
17 transcript.

18 With these questions, if at any
19 time you feel like you do not understand the
20 question or if you feel like it's ambiguous
21 or can be clarified, just let me know and I'm
22 happy to clarify it.

23 I'm seeing your CV. I don't think
24 I've ever seen a 100-page CV before, but
25 typically we ask about prior deposition

1 D. Schonfeld

2 experience. So have you been deposed before?

3 A. Yes.

4 Q. About how many times?

5 A. I'm not sure of the exact count.

6 I counted about a year ago that I've been
7 deposed a little over 80 cases and the number
8 went up since, but I'm not sure of the number
9 of actual depositions because in some of
10 those cases it was a single two-hour
11 deposition. And in other cases, it was
12 repeated deposition over many years. So --
13 but I've not counted.

14 Q. And broadly, what did those cases
15 relate to?

16 A. Well, a lot of them -- so they
17 related to different things. Some of them
18 related to -- majority related to patent
19 litigation either in the form of IPR
20 proceedings or district court or ITC
21 hearings. Then other depositions were in
22 different areas, intellectual property issues
23 like copyright, trade secrets, antitrust.
24 Other depositions were outside of
25 intellectual property, but related to

1 D. Schonfeld
2 technology in contract disputes and tax
3 issues, but the majority were patent-related.

4 Q. How many times would you say you've
5 been an expert witness in an IPR?

6 A. I don't know the exact number, but
7 I would guess if by being an expert witness,
8 you mean I've been retained probably on the
9 order of maybe 10 to 15 perhaps. And if by
10 expert witness, you mean that I submitted a
11 declaration, that number would be slightly
12 smaller. And I've probably been deposed in
13 IPR related matters maybe, probably six,
14 seven times is a rough ballpark estimate.

15 Q. In those prior IPRs, were you on
16 the patent owner side or the petitioner side
17 or both?

18 A. Both.

19 Q. So then is it fair to say that
20 you're familiar with the basic terms and
21 concepts in an IPR such as petitioner, patent
22 owner, that sort of thing?

23 A. As a layperson would, yes.

24 Q. Okay, great.

25 And then I understand you've done

1 D. Schonfeld
2 some of these depositions before, but the
3 rules and the process of this deposition, so
4 today I'm going to, for our convenience,
5 refer to the documents that we discuss by
6 their exhibit numbers in the IPR.

7 I saw that in your declaration you
8 do open with a table of exhibits, so I think
9 you're likely familiar with the exhibit
10 numbers. I'll post these in the chat and you
11 can download them and look at them. I'll
12 give you a chance to take a look at each of
13 these documents before we proceed with
14 questioning.

15 And for the references, the prior
16 art references at issue in this case, we
17 might sometimes refer to them as Kim or
18 Fujimura. If -- with those being kind of the
19 process and the rules that we're gonna engage
20 with here, does that sound good today?

21 A. Sounds reasonable, yes.

22 Q. Okay. And how long have you been
23 engaged by Samsung in this case?

24 A. I don't remember exactly when, but
25 it was, obviously, sometime before I

1 D. Schonfeld

2 submitted the declaration. I think it was
3 around maybe May of 2025, around that time
4 frame, but I could be off by a few months
5 here or there.

6 Q. Okay. And do you speak any
7 languages other than English?

8 A. I do. I don't speak any language
9 well, but I do.

10 Q. Do you speak Japanese?

11 A. Only a few words when I'm visiting.

12 Q. Turning to the declaration and how
13 you prepared for today's deposition, what did
14 you do to prepare for today's deposition?

15 A. I met counsel and read documents.

16 Q. And what documents did you review?

17 A. I reviewed the patent at issue, my
18 declaration and the prior art, those are the
19 documents that I focused on.

20 Q. Okay. Did you review the patent
21 owners preliminary response in this case?

22 A. Superficially I've seen it, I've
23 reviewed it superficially, but I have not
24 studied it.

25 Q. And are you aware that the patent

1 D. Schonfeld

2 owner has filed a motion to amend in this
3 case?

4 A. I am.

5 Q. And are you aware of the content of
6 the amendments?

7 A. Well, not in its entirety, but I
8 did glance at, at least Claim 1 of the
9 amended claim.

10 Q. Okay. So let's move on to the
11 patent at issue in this case. So I'm going
12 to post to you Exhibit 1001. Going to
13 attempt to post this to you. Sounds like you
14 may have a paper copy of this, but for
15 purposes of the deposition, we'll be
16 referring to the electronic copy I just
17 shared.

18 (Exhibit 1001 was introduced.)

19 Q. Please take a moment to review this
20 document and confirm that it's 1001 as you
21 understand it, this is US Patent 7,952,645.

22 A. Yeah, that's the patent to the
23 claim.

24 Q. Great. And when do you understand
25 this patent to be publicly available?

1 D. Schonfeld

2 A. Are you asking me about the
3 priority date of the patent, or are you
4 asking me when it was issued?

5 Q. Yeah, let's take that back.

6 So let's -- I'll ask, what is the
7 relevant priority time frame for this patent?

8 A. (Document review.)

9 As I stated in paragraph 29 of my
10 declaration, which is not yet an exhibit in
11 this deposition, I'll just read the last
12 sentence, the '645 patent's earliest possible
13 effective filing date, therefore, is
14 November 24, 2005.

15 Q. Okay. And just to make sure that
16 we address that, I can go ahead and provide
17 Exhibit 1003 though certainly that is one of
18 the primary topics today.

19 So I've dropped into chat a copy of
20 Exhibit 1003 from the IPR. This is a
21 document bearing the title of Declaration of
22 Dr. Dan Schonfeld in Support of Petition
23 Inter Partes Review of US Patent No.
24 7,952,645.

25 (Exhibit 1003 was introduced.)

1 D. Schonfeld

2 Q. If you want to take a moment to
3 confirm that this document is what I said it
4 is.

5 A. It appears to be.

6 Q. Okay, great.

7 So are you familiar with the
8 state-of-the-art from 2005 in this area?

9 A. Again, if you go to my declaration
10 in paragraph 36, I state:

11 I met and exceeded the above
12 qualifications for a POSITA as of at least
13 November 24, 2005.

14 Q. As to the '645 patent, what do you
15 understand the field that it relates to to
16 be?

17 A. So as I state, for example,
18 paragraph 30 of my declaration, I stated:

19 The '645 patent relates to a video
20 processing apparatus that corrects a video
21 signal.

22 This is in my view what it
23 generally is directed to. And in particular,
24 in my characterization of a person of
25 ordinary skill in the art to put it -- to

1 D. Schonfeld
2 answer your question a bit more broadly, I
3 focused in paragraph 35 on there where I said
4 that in addition to educational experience,
5 one would have professional experience with
6 image processing, video processing, or other
7 relevant industry experience. And so that is
8 putting the '645 patent, as I mentioned, is
9 directed to video processing that corrects a
10 video signal and more broadly that topic is
11 in the field of image processing and video
12 processing.

13 Q. Does the '645 patent describe any
14 problems that it solves?

15 A. (Document review.)

16 I think I address it in
17 paragraph 31 of my declaration and I will not
18 read the whole thing, but he talks broadly
19 about the picture quality in various
20 circumstances and I'll just characterize it
21 broadly as wallpaper, black no-picture areas.
22 And in particular, I'm referring to column 1
23 of the patent. And I think that specifically
24 begins with the beginning of the section
25 entitled -- it's in the summary section

1 D. Schonfeld
2 rather than the background section.

3 Q. Okay. Your declaration talks about
4 the different embodiments of the '645 patent.

5 So what do you understand the third
6 embodiment of the '645 patent to be?

7 A. So in paragraph 32 of my
8 declaration, I state that:

9 In the patent's third embodiment,
10 if the apparatus detects that the video
11 signal includes patent portions, it does not
12 correct the video signal.

13 And I go on to explain it in
14 subsequent paragraphs. And this is echoed in
15 the issue that they're described at the
16 beginning of the third embodiment in
17 column 16 where the patent states what
18 happens when converted -- quote:

19 When converting contents having an
20 aspect ratio of, for example, 4-to-3 to a
21 video signal having an aspect ratio of
22 16-to-9 and corresponding to an image which
23 is long sideways, for example, in a
24 broadcasting station, patent portions such as
25 patterned wallpaper areas or single-colored,

1 D. Schonfeld
2 no-picture areas are added to the left and
3 right of the content sometimes. It is
4 desirable that the patent portions are
5 stationary in order to make the video image
6 easy to see. However, a part of the mark or
7 the like may be changed. That's the end of
8 the first paragraph. And I think it sets the
9 general description of what third-party
10 embodiment is about.

11 Q. So in the third embodiment when
12 pattern portions are detected, what does the
13 '645 patent solution correct?

14 A. (Document review.)

15 If you look at paragraph 32 of my
16 declaration, I state that:

17 In the patent's third embodiment,
18 if the apparatus detects that the video
19 signal includes pattern portions, it does not
20 correct the video signal.

21 And so at least it corrects it --
22 the image portion of where the content
23 resides. And then it has various variations
24 about all this, and they spend both the third
25 embodiment and the fourth embodiment

1 D. Schonfeld
2 depending whether it's wallpaper, whether
3 it's a black or white region that's constant.
4 And so it gives a lot of different
5 permutations of this, but generally it
6 corrects the actual image.

7 Q. So in your answer, you said that it
8 corrects the image portion where the content
9 resides in the third embodiment.

10 So when in your -- I'll start the
11 question over.

12 In your declaration paragraph 32
13 when you said, "if the apparatus detects that
14 the video signal includes pattern portions,
15 it does not correct the video signal," does
16 that include correcting the content area of
17 an image?

18 A. What I'm saying in paragraph 32, if
19 the apparatus detects that the video signal
20 includes pattern portions, it does not
21 correct the video signal, doesn't mean that
22 there is no correction to some parts of the
23 video signal that they're unrelated to
24 pattern portion. And it just means that the
25 pattern portions within the video signals are

1 D. Schonfeld

2 not corrected.

3 And this is consistent with the
4 specifications. It's consistent with what
5 the claims require. Otherwise the claims
6 would've been nonsensical, in my view, if you
7 don't interpret it that way.

8 Q. So in your view, if the decision of
9 the '645 patent was do not apply video
10 correction, that would be nonsensical?

11 A. You can see throughout the
12 specification, it says that it corrects or
13 does not correct, but it does not apply it to
14 the entire video signal, but only to the
15 portions that are pattern portions or the
16 content part separately.

17 And yes, in my view if you take,
18 for example, claim limitation 1A and you see
19 what it requires, which is a controller which
20 controls the corrector to cause the corrector
21 to correct the video signal input to the
22 input unit when the pattern portions are not
23 contained in which control the corrector to
24 cause the corrector not to correct the video
25 signal when the pattern portions are

1 D. Schonfeld
2 contained, and we are dealing with a video
3 signal which has been -- where you have a
4 detector which detects whether pattern
5 portions are contained in the video signal.

6 And so in my view, it does not mean
7 that if you have a little -- I do not
8 interpret this to mean that if you have a
9 pattern portion, you do not do any correction
10 anywhere, and I do not view -- that's
11 essentially my answer.

12 So it does not mean that that
13 statement is limiting to what happens to the
14 entire video signal, but at least to the
15 portions, for example, when it says "do not
16 correct" -- where it says -- where the claim
17 limitations, for example, say not to correct
18 the video signal when the pattern portions
19 are contained, it does not mean that the
20 entire video signal, including the content
21 are not corrected.

22 Q. So the term "video signal," that's
23 one of the claims that you provided claim
24 construction for, is it fair to say that a
25 single frame could be the video signal?

1 D. Schonfeld

2 A. As I state in paragraph 30, the
3 interpretation that I adopted and that I have
4 for a video signal, which is that it includes
5 a logical unit of a video and one of the
6 logical units, as I explain in paragraph 40,
7 is the frame where I state that this
8 interpretation is confirmed by the
9 '645 patent specification, which discloses
10 operating on logical units such as frame and
11 the scene and I specifically quote from the
12 specification which uses frame as a unit.

13 And so the answer to your question
14 is yes, I agree, a frame could be a unit.

15 Q. In the third embodiment of the
16 '645 patent, if a single frame had pattern
17 portions detected in it, would the frame be
18 subject to correction?

19 A. First of all, I don't know what you
20 mean by the third embodiment, if you want to
21 do it. So third embodiment is not a specific
22 algorithm, it's a collection of different
23 variations and alternatives. So I'm not in
24 the position to answer it for the third
25 embodiment, and it's not -- it's not a claim.

1 D. Schonfeld

2 Q. Okay. So in the content described
3 in the '645 patent with respect to the
4 section called "third embodiment," you don't
5 see it as clearer how it would apply to a
6 frame that has pattern portions in it?

7 A. (Document review.)

8 So I would have to go back and
9 review the embodiment again. But my
10 recollection is that if you look, for
11 example, at Figure -- Figures 29, 30 and
12 31 -- sorry, yeah, and 31 and 32, they make
13 clear that the enabling -- that the signal
14 that is generated, the enabling signal is
15 such that it would allow for enhancement in
16 the area of the 240dot in Figure 29 which is
17 the center area with the images and it would
18 disable it in the left and right margins.
19 That's my recollection of it, I would have to
20 go back and confirm it, but that would be at
21 least one example of the third embodiment
22 that is discussed. And I think it's echoed
23 in the statement of the characterizing the
24 third embodiment which, for example, in
25 column 19 around line 55, it says:

1 D. Schonfeld

2 As a result, the picture quality
3 enhancement processing at the time of display
4 of contents having portions is stopped.

5 So my recollection is that when you
6 have those portions which are the left and
7 right columns on the side, the enhancement is
8 stopped, but it is still enabled in the
9 middle. Again, I would have to go back and
10 study it to answer that question with
11 certainty.

12 Q. So is it your testimony today that
13 it's nonsensical to disable video correction
14 on the content portion of a frame when
15 pattern portions are detected in the frame?

16 A. No, not at all. I hope I didn't
17 say that.

18 Q. I believe it was part of your
19 answer on the third embodiment, so maybe
20 let's clarify that if that wasn't what you
21 said.

22 So looking back at paragraph 32 of
23 your declaration, it says:

24 In the patent's third embodiment,
25 if the apparatus detects that the video

1 D. Schonfeld
2 signal includes pattern portions, it does not
3 correct the video signal.

4 You said that this means that it
5 does not correct the pattern portions, but
6 that it would still correct the content
7 portions, correct?

8 A. It could still correct the content
9 portions. I'm not making a statement that by
10 not correcting the video signal I'm not
11 correcting it anywhere, not correcting it in
12 the area of the pattern portions which is
13 consistent with my recollection of the patent
14 specification and I believe the third
15 embodiment as well.

16 And so it would be nonsensical to
17 interpret that this statement, and quite
18 frankly the claims, to mean that if there is
19 any patent portion anywhere, it would stop,
20 correct the entire video signal in its
21 entirety. That's not what the patent is
22 about in my view.

23 Q. Okay. Let's turn to the fourth
24 embodiment then, you discuss this in
25 paragraph 33 of your declaration, so I'll

1 D. Schonfeld

2 ask, how would you characterize the fourth
3 embodiment of the '645 patent?

4 A. Well, I think I characterize it in
5 paragraph 33. So -- and what I said was in
6 the patent's fourth embodiment, the apparatus
7 detects whether pattern portions are black
8 no-picture areas. If they are, the video
9 signal is corrected. If the pattern portions
10 are not a black no-picture area portion, the
11 video signal is not corrected.

12 So it's generally a refinement of
13 what's taught in third patent embodiment but
14 with a further nuance that it looks at the
15 pattern portions and that the specific nature
16 of the pattern portions whether it's black
17 no-picture area or not, like a wallpaper, and
18 treats it differently.

19 Q. So in your declaration where you
20 say, "the apparatus detects whether the
21 pattern portions are black no-picture areas,
22 if they are, the video signal is corrected."

23 What is the correction?

24 A. So you can see that, for example,
25 this is described in Figures 43, 44, which

1 D. Schonfeld
2 show that a correction takes place. And then
3 specifically if you look at Figure 46, it
4 gives an example of such a correction. You
5 can see on the bottom of 46, if the input is
6 0 to 16, it gets mapped to solid black and
7 the patent talks about it.

8 Let me just find it where he
9 describes it. This is in column 23 and line
10 47, for example. Even if the content had the
11 input gradation in the range of 0 to 15,
12 correction is conducted so to fix the output
13 for the input signal in the range of 0 to 15
14 to 0 as shown in Figure 46 is a correction
15 characteristic suitable for contents have
16 no-picture area portion.

17 Q. So in the situation where a
18 no-picture area is detected, does the fourth
19 embodiment apply video correction to the
20 no-picture areas?

21 A. So as I state in paragraph 33 of my
22 declaration, in the patent's fourth
23 embodiment, the apparatus detects whether the
24 pattern portions are black no-picture area.
25 If they are, the video signal is corrected.

1 D. Schonfeld

2 And so the answer is if it's a black
3 no-picture area, it is corrected.

4 Q. That correction is applied to the
5 no-picture area itself or a correction is
6 applied to any part of the video?

7 A. (Document review.)

8 So it's -- the decisions are not
9 done for the entire -- same issue we
10 addressed earlier. These decisions are done
11 on the video signal, but it does not mean
12 that it's applied to the entire video signal.
13 For example, the correction of the black
14 no-picture area in Figure 46 makes the output
15 zero. It does not mean that the entire video
16 signal will become zero.

17 Q. So the correction on Figure 46 that
18 you're referring to is applied to pixels that
19 are in the black no-picture area?

20 A. Yeah, I said zero to 16 the
21 specification describes it as zero to 15 and
22 those values are all sent back to zero and
23 the specification describes the advantages
24 and disadvantages of it in column 23 right
25 underneath the portion I read.

1 D. Schonfeld

2 Q. Are black no-picture areas always
3 zero luminosity?

4 A. I don't think the patent describes
5 anything as always, and in particular it
6 talks about noise being present and,
7 therefore, it may not be zero.

8 And part of the idea of the
9 correction we were just talking about is to
10 address it and to make it perfectly black in
11 that region. So if it was detected to be a
12 black no-picture area and if the correction
13 was applied and the correction happens to be
14 the correction in Figure 46 that we just
15 talked about, then the output of that would
16 be zero luminance. But the question as you
17 asked it, the answer would be no.

18 Q. And in the second part of the
19 fourth embodiment where the pattern portions
20 are not a black no-picture area portion,
21 it's -- your declaration says, the video
22 signal is not corrected.

23 So what does it mean to not correct
24 the video signal?

25 A. (Document review.)

1 D. Schonfeld

2 If you look, for example, at
3 Figure 44, it indicates when the wallpaper
4 flag is equal to one, correction data is
5 equal to zero, and I could look for it and
6 find it, but in the interest of time, I'll
7 just paraphrase, the patent describes this as
8 applying no correction by setting the
9 correction data equal to zero.

10 Q. Applying no correction to what?

11 A. Let me just find it. One second.

12 Well, in particular -- in
13 particular in column 22 around line 65, it
14 states:

15 When the wallpaper flag is one, it
16 is 4401, i.e., a black no-picture area
17 portion is contained in the pattern portion,
18 then the CPU 7 sets the correction data equal
19 to zero at S4403 and proceeds to S4406.

20 And so it's a correction to
21 whatever was flagged on the wallpaper.

22 Q. The correction data referred to in
23 that sentence, does that refer to correction
24 data for the wallpaper region or for the
25 whole frame?

1 D. Schonfeld

2 A. My understanding and this issue,
3 you're asking from my perspective the same
4 question always about whether it's -- a
5 decision is made for the entire frame or
6 video signal.

7 These embodiments are based on very
8 specific timing information of the type that
9 is shown. For example, for fourth embodiment
10 as is shown in Figures 40, 41 and 42 and
11 these timing information limits the -- those
12 decisions to very specific part of the video
13 signal.

14 Q. What do you mean by "part of the
15 video signal?"

16 A. I mean they define when the signal
17 is enabled and when it's not. And they show
18 how the enabling signal, for example, in
19 Figure 38 factors in to decide whether to do
20 a correction or not because that's taking
21 input and I believe it's the input to -- I'm
22 doing it from memory, but I believe it's the
23 input to 154 in Figure 37, which is the
24 characteristic point detector. I can confirm
25 it in the spec, I'm doing it from memory, but

1 D. Schonfeld

2 I'm pretty sure I'm right.

3 Q. Okay. And let's -- we've been
4 talking loosely about the claim construction.
5 One of the terms that you construed is
6 "corrects the video signal," this is on
7 page 16 of your declaration starting with
8 paragraph 44.

9 As I understand your construction
10 written here, correcting the video signal
11 includes correcting part of the video signal;
12 is that correct?

13 A. The answer is it's correct.

14 Q. In the next paragraph you get into
15 this is because reading correcting to be
16 applying to a full-video signal excludes
17 embodiments of the '645 patent.

18 Which embodiment would it exclude
19 for this to mean correct an entire video
20 signal?

21 A. I specifically address this in
22 paragraph 45 where I refer to -- I will not
23 read it, I refer to Figure 21, column 13,
24 line 38 to 49, as well as Figures 23, B and
25 D, columns 14, line 3 to 30. And I refer to

1 D. Schonfeld
2 other places too. But I think it would be,
3 quite frankly, inconsistent with almost all
4 of the embodiment, if not possibly all of
5 them.

6 Q. Does any part of the embodiment
7 discussed in Figure 21 or on column 13 relate
8 to pattern detection?

9 A. I don't recall if that particular
10 embodiment relates to patent detection, but
11 embodiments we just spoke about relate to
12 pattern detection and those embodiments would
13 also be inconsistent with an interpretation
14 that does not allow for correction of part of
15 the video signal.

16 Q. Would it be fair to characterize
17 that construction as allowing for correcting
18 just part of the video signal?

19 A. I don't know exactly what you mean.
20 I know that the specification and the claims,
21 but especially in specification when you say
22 I correct the video signal and not correct
23 the video signal. And those are often
24 applied simultaneously in the same embodiment
25 depending on whether there is a portion or

1 D. Schonfeld
2 content or not. And that would mean that the
3 only reasonable interpretation of correct the
4 video signal and equally not correct the
5 video signal is to say that that is
6 applicable to a part of the video signal.

7 MR. BUERGI: Scott, we've been
8 going a bit over an hour, if we can
9 have a break whenever a logical time
10 is, that would be nice.

11 MR. KELLY: Yeah, I think we'll
12 get there in just a moment.

13 Yeah, I think it makes sense to
14 take a break now. Do we want to
15 reconvene in ten minutes?

16 MR. BUERGI: That's fine with me.

17 THE COURT REPORTER: We're off the
18 record.

19 (Off the record from 11:04 a.m. to
20 11:14 a.m.)

21 THE COURT REPORTER: We're back on
22 the record.

23 BY MR. KELLY:

24 Q. So earlier you answered about some
25 of the embodiment questions that they were

1 D. Schonfeld

2 not claims. So let's turn to the claims.

3 With respect to the claims in this
4 case, did you have an opinion on any sort of
5 correspondence to the embodiments?

6 A. I don't believe -- I don't believe
7 I discussed this in my declaration. I don't
8 believe I formed such an opinion.

9 Q. Okay. We'll move on then.

10 So in the claim construction
11 portion of your declaration on page 18
12 starting in paragraph 48. This is a claim
13 construction of the term "when the pattern
14 portions are contained" and similar terms.
15 There's a discussion here of "when" versus
16 "whenever." I found it a little difficult to
17 understand. What did you mean, what is the
18 construction of this term?

19 A. (Document review.)

20 So let me first begin by saying
21 this is not a construction I propose. As I
22 state in paragraph 49, I've been asked by
23 counsel to adopt this apparent construction
24 based on the contentions.

25 But specifically in the first

1 D. Schonfeld
2 sentence, I explain that patent owner
3 apparently construes when these claims
4 element to be broader than whenever and to be
5 satisfied by certain instances in which the
6 pattern portions are contained, the pattern
7 portions are not contained, and the pattern
8 portions are not the no-picture area
9 respectively.

10 And so if we take, for example,
11 Claim 1 and it states a controller which
12 controls the corrector to cause the corrector
13 to correct the video signal input to the
14 input unit when the pattern portions are not
15 contained and which controls the corrector to
16 cause the corrector not to correct their
17 video signal when the pattern portions are
18 contained. I understand the "when" in this
19 case to be that -- that this is satisfied by
20 being in certain instances rather than
21 always.

22 Q. Okay. I'd like to move on to the
23 Kim prior art. So I'm going to drop into the
24 chat Exhibit 1004 from the IPR.

25 (Exhibit 1004 was introduced.)

1 D. Schonfeld

2 Q. Please take a look at it. This
3 document is US patent application publication
4 to Kim US 2004/0156545. Please let me know
5 when you have the document open and
6 available.

7 A. It's open and available.

8 Q. Okay, great. And looking at Kim,
9 when is this technical disclosure from?

10 A. As I state in paragraph 55 of my
11 declaration, Kim was filed in February 7,
12 2003 and published August 12, 2004. So it
13 depends on whether you are referring to the
14 publication date or the filing date.

15 Q. So taking 2003 when Kim was filed,
16 are you familiar with the state of the art in
17 this technical area as of 2003?

18 A. I've been working in the general
19 area of image and video processing since the
20 mid-1980s, so yes.

21 Q. Are you generally familiar with
22 Kim's discussion of the pattern-like image
23 detection parameter r ?

24 A. In the context of Kim, yeah
25 definitely.

1 D. Schonfeld

2 Q. Would you agree that the
3 parameter r relates to the likelihood that
4 the input image is a pattern-like image?

5 A. I think Kim specifically says in
6 paragraph 42 that, and I'll just quote from
7 the middle:

8 The important aspect is that the
9 enhancement be minimized or eliminated as it
10 becomes more likely that the input image is a
11 pattern -- f is a pattern-like image.

12 And it goes on to say in
13 paragraph 43 similar things to the effect of
14 that if the pattern-like image detection
15 parameter r obtained from the pattern-like
16 image detection parameter r calculation
17 device 34 equals zero, i.e., a normal input
18 image.

19 And it goes on. But it is
20 described that when r is -- when r is small --
21 sorry. When r is close to one I believe,
22 then it would be more likely to be a
23 pattern-like image. And it says it in
24 paragraph 43, for example, if the pattern
25 image detection parameter r equals one,

1 D. Schonfeld

2 r equals one, i.e., a pattern-like image,
3 then the adjusted image g. And then it
4 proceeds from there.

5 Q. So in your discussion of Kim, you
6 talked about an input image. What do you
7 understand input image to mean in Kim?

8 A. You said in my discussion of Kim,
9 which paragraph are you referring to in my
10 declaration?

11 Q. In your answer just now as well as
12 those portions of Kim that you read, they
13 talk about an input image. For
14 clarification, in Figure 4 of Kim there's an
15 input image f. So I'll repeat the question.

16 What do you understand input
17 image f to mean in Kim?

18 A. So if you look at paragraph 40 for
19 example, it states Figure 3 is a block
20 diagram of exemplary embodiment of an
21 apparatus 20 for detecting a pattern-like
22 image for the incoming video or imagine
23 input, and then it proceeds -- well, it says,
24 a histogram of one frame f of the picture is
25 determined. So I view f as generally a frame

1 D. Schonfeld

2 in a sequence of frames.

3 Q. Okay. Looking at Figure 1 of Kim,
4 is that an example of an input image that has
5 a pattern?

6 A. Specifically describes it in Kim in
7 paragraph 16 as a pattern-like image. So if
8 what you meant that it's a pattern-like
9 image, I would agree.

10 Q. And would you agree that Kim
11 describes this type of pattern-like image as
12 something that the system should not correct
13 so that it could avoid unwanted or
14 undesirable results?

15 A. As I state in paragraph 56 of my
16 declaration towards the end of the paragraph
17 on page 23, I state that:

18 In Kim, if the image is a
19 pattern-like image, the system does not
20 enhance the image.

21 Q. Is there any portions of the image
22 in Figure 1 that are not part of the pattern?

23 A. I haven't studied that. I haven't
24 seen and I don't recall offhand whether Kim
25 has any such disclosure. I think it does

1 D. Schonfeld
2 describe -- it does talk about -- if you look
3 at paragraph 2, it talks at the very end
4 about enhancing an input image with a
5 pattern-like image. And so the artifacts
6 caused by it, so when he talks about it being
7 with its at least contemplating having the
8 pattern not be the entire frame, but I
9 haven't really studied that issue in Kim.

10 Q. Based on your understanding of Kim,
11 does Kim have any discussion of only
12 enhancing part of a frame?

13 A. Well, it has the discussion as I
14 describe in my declaration of only enhancing
15 part of a video signal, for example, a frame.
16 I don't recall offhand whether it
17 specifically discusses only enhancing part of
18 a frame, it might. It would be consistent
19 with what I just pointed to in paragraph 2,
20 but I haven't studied it. It was not part of
21 my analysis.

22 Q. What element in Kim do you map to
23 the video signal in the claim, in Claim 1?

24 A. (Document review.)

25 I discuss this in paragraphs 64 and

1 D. Schonfeld
2 65 of my declaration, for example, and I
3 point to a video signal containing contents
4 as input referring to the incoming video and
5 I also describe the video signal containing
6 contents in paragraph 65 as the incoming
7 video. So that would include one or more
8 frames within the video signal would be
9 corresponding to the video signal in the
10 claim language.

11 Q. All right. I'd like to ask you
12 about Figure 4 of Kim. So we have input
13 image f coming in from the left and a number
14 of arrows coming out of it, one of which goes
15 to image enhancer.

16 What do you understand that arrow
17 to teach or imply?

18 A. That the signal serves as an input
19 coming into a block called image enhancement.

20 Q. And then output from the image
21 enhancer is something labeled enhanced
22 image e; is that correct?

23 A. That is correct.

24 Q. Let's turn to Figure 6 of Kim. So
25 at what part of Kim does it decide if there

1 D. Schonfeld

2 is a pattern-like image?

3 A. So if you look, first of all, at my
4 declaration paragraph 67, for example, around
5 the middle, I state:

6 Thus, when r equals one, the image
7 from the incoming video is a pattern-like
8 image.

9 And then if you look at Kim, I
10 think we kind of -- I discuss that paragraph
11 earlier, Kim paragraph 43 in the middle it
12 says:

13 Also note that if the pattern-like
14 image detection parameter r equals one, r
15 equal one, i.e., a pattern-like image, then
16 the adjusted image, and then he proceeds.

17 So if he determines that r equal to
18 one, then it determines with certainty that
19 it's a pattern-like image and that that's
20 when Kim knows with certainty it's dealing
21 with a pattern-like image.

22 Q. In Figure 4, what is the role of
23 image enhancer 32?

24 A. Well, it states, for instance, in
25 paragraph 41, it states in Figure 4, f is an

1 D. Schonfeld
2 input image and e is an enhanced image that
3 is obtained from an image enhancer 32
4 constructed for performing a particular
5 enhancement method. The enhancement method
6 can be any one of a number of known
7 enhancement methods and will, therefore, not
8 be described in detail in this disclosure.

9 So it's -- the role is to, as it
10 states, to perform a particular enhancement.

11 Q. When r equals one, what does image
12 enhancer 32 do?

13 A. Well, if you look at -- if you look
14 at Figure 4, image enhancer 32 doesn't even
15 know what the value of r is. It just applies
16 the image enhancer 32 to the input image f
17 always.

18 Q. You cited to Kim, paragraph 43, as
19 discussing what happens when r equals one or
20 when r equals zero. But what happens when r
21 is in between one and zero?

22 A. So if you look at my declaration,
23 I rely on the disclosure where r is either
24 one or zero. And so what happens when it's
25 in between zero and one is not really

1 D. Schonfeld
2 relevant for my analysis. But if you look at
3 paragraph 42, it states that:

4 The important aspect is that the
5 enhancement be minimized or eliminated as it
6 becomes more likely that the input image f is
7 a pattern-like image. It should now be
8 apparent -- let me just get it --

9 In this exemplary embodiment, the
10 adjusted image g is obtained by using a mixer
11 36 to mix the input image f and the enhanced
12 image e according to equation (6), which is
13 provided right below that paragraph.

14 So even though I'm not relying on
15 it for the purpose of my analysis in my
16 declaration, if r is in between, then
17 equation (6) is applicable as it is always,
18 and then because it is not certain, it just
19 had a high or low likelihood of whether it's
20 a pattern-like image, then it sort of, to use
21 a colloquialism, it just hedges its bet and
22 provides mixture of the two. And the more
23 confident it is that it's a pattern-like
24 image, which means that the value of r is
25 closer to one, the more it disables the

1 D. Schonfeld
2 enhancement portion until it's certain when
3 r is equal to one and then it completely
4 eliminates it.

5 Q. So in a situation where r is not
6 quite one, is it fair to say that Kim does
7 not meet the claim limitation of when a
8 pattern-like portion is detected do not
9 correct the video signal?

10 A. Well, I did not rely on it for that
11 purpose when r is not equal to one. And what
12 happens when r is not equal to one, as it
13 makes clear, it just has a certain likelihood
14 that it's the pattern-like image, but it
15 hasn't made a specific determination that it
16 is a pattern-like image until the value of
17 r equal to one is reached.

18 Q. Does the mixer in Kim as described
19 in paragraph 42 correct the entire frame or
20 just part of it?

21 A. Well, it depends -- it depends on
22 what the value of r is. If r is equal to
23 one, then it corrects none of it. If r is
24 equal to zero -- or anything other than one,
25 then it will enhance to some degree all of

1 D. Schonfeld

2 it.

3 Q. In those enhancements are
4 corrections?

5 A. The enhanced image is a corrected
6 image. You rely on the case where r is equal
7 to zero. What happens between r equals zero
8 to one is sort of a muted correction,
9 depending on how large the value of R is, the
10 larger it is the more muted it is. But it's
11 not part of my analysis, it's not something I
12 thought about. It's not really relevant to
13 my analysis.

14 Q. For Kim's calculation in
15 paragraph 41, which you cited earlier, it
16 talks about how they can do any particular
17 enhancement method.

18 In 2003, would those enhancement
19 methods necessarily be done on a central
20 processing unit?

21 A. I don't know exactly what you mean
22 by that. But in 2003, they would be done on
23 the processor, such as a central processing
24 unit or a close derivative of a central
25 processing unit such as a general processing

1 D. Schonfeld
2 unit perhaps. But most of the time for these
3 type of operations, central processing unit
4 would be the choice.

5 Q. Does Kim describe what type of
6 hardware is used to implement its solution?

7 A. (Document review.)

8 Kim just refers to things like the
9 image enhancer 32 mixer 36. And as I state,
10 for example, in paragraph 74:

11 A POSITA would've further
12 understood that the disclosed functionality
13 is performed by executing instructions in a
14 general purpose processor such as a CPU or
15 equivalent, or performed by a hardware
16 equivalent to such a CPU because such
17 component would be required to implement a
18 disclosed functionality.

19 Kim also inherently necessarily
20 discloses a processor such as a CPU or
21 equivalent for the same reason. It would've
22 been obvious to a POSITA to implement a
23 functionality of Figure 4 in a CPU or
24 equivalent as a well-known way of
25 implementing such functions, such a CPU

1 D. Schonfeld
2 would've been well known to a POSITA.

3 And I don't recall your question
4 precisely, but I would simply say I believe
5 it was Kim disclosed such a CPU or hardware,
6 Kim discloses processors, it refers to them
7 by their function name, mixer 36, image
8 enhancer 32. And, therefore, it inherently
9 discloses hardware processors and those
10 hardware processors would be either CPUs,
11 almost certain they would be CPUs or they
12 would be some equivalent structure, such as a
13 GPU or other forms of dedicated processors.

14 Q. Okay. Looking at -- I'll strike
15 that question.

16 Do you understand any part of Kim
17 to be directed to a portable telephone or
18 mobile device?

19 A. (Document review.)

20 Kim, as it states in the field of
21 the invention, relates to the field of video
22 signal processing and in particular talks
23 about methods for detecting pattern-like
24 image. So the field of video signal
25 processing is a very broad field, and it

1 D. Schonfeld
2 includes implementation of video signal
3 processing in many devices and one of the
4 more popular ones nowadays is telephones.

5 So in that sense it's related, but
6 I don't recall whether Kim specifically
7 describes applications in different specific
8 devices, I think -- I believe it's more
9 broad, but it might talk about telephones
10 specifically. But it -- definitely the field
11 of video signal processing includes
12 performing video signal processing in
13 telephones.

14 Q. Okay. I'd like to shift gears and
15 talk about Fujimura now, the second
16 reference. So I'm gonna drop into the chat
17 what is marked in the IPR as Exhibit 1005.
18 This is a US patent to Inventor Fujimura,
19 F-U-J-I-M-U-R-A. It's US Patent 5,808,697.

20 (Exhibit 1005 was introduced.)

21 Q. Please let me know when you have
22 this document open and available.

23 A. I do.

24 Q. Okay. As we discussed with the
25 other references, when was the Fujimura

1 D. Schonfeld

2 patent filed?

3 A. As I state in paragraph 58 of my
4 declaration, Fujimura was filed on June 14,
5 1996. And I think you specifically asked
6 this time only about the filing.

7 Q. That's right. And are you familiar
8 with the state-of-the-art in 1996?

9 A. Yes.

10 Q. And was that state-of-the-art
11 different versus Kim's 2003 filing?

12 A. There have been some advances, but
13 generally speaking it's from the point of
14 view of the functional operations that we're
15 talking about here. There were not
16 significant changes, but maybe some of the
17 hardware implementations might have changed
18 because GPUs were introduced between the two,
19 but nothing specific comes to mind as it
20 relates to this specific technology.

21 Q. Sorry. When you say "GPUs," what
22 are you referring to?

23 A. Graphic processing unit. It's a
24 particular type of hardware for doing
25 parallel operations more efficiently.

1 D. Schonfeld

2 I refer to them when I talked about CPUs and
3 how you could implement Kim on similar
4 structures to CPUs, GPUs would be another
5 example.

6 Q. So looking at Fujimura, what
7 problems do you understand Fujimura as being
8 directed to?

9 A. (Document review.)

10 So Fujimura in column 1
11 specifically talks about the kind of problems
12 that it addresses and talks about, for
13 example, problems with flickering, around
14 line 36 of column 1.

15 Then talks about around line 48,
16 the unnatural chrominance enhancement because
17 chrominance and luminance are not related in
18 a fixed way around line 50.

19 One, it talks about the mapping
20 functions are calculated selectively and
21 incorrectly. And then when he talks about
22 the summary of the invention, he talks about
23 the list of objects of the invention and he
24 talks about enhance of the luminance contrast
25 of video signal without loss of local detail,

1 D. Schonfeld
2 enhance luminance contrast without causing
3 undulating distortion, he talks about
4 flickering and it continues. So these are
5 the types of problems that Fujimura is trying
6 to address.

7 Q. And how does Fujimura solve those
8 problems?

9 A. So it talks about doing a number of
10 different things, such as separating the --
11 as I state in paragraph 59, it separates
12 the -- and it enhances luminance contrast, it
13 enhances chrominance contrast separately as
14 one issue. And also, if you look at the
15 bottom of the last line of the abstract of
16 Fujimura, it states:

17 For video signals with non-picture
18 bands, these enhancements are preferably
19 restricted to the picture area. If black
20 offset is present, it is preferably removed.

21 So it addresses what it refers to
22 as a letterbox structure and how to deal with
23 the enhancement in that context by either
24 allowing enhancement of certain portions and
25 not others.

1 D. Schonfeld

2 Q. Okay. Please turn to column 13 in
3 Fujimura. Let me know when you have that up.

4 A. I do.

5 Q. Looking at lines 50 through 58 when
6 Fujimura says that it outputs a pair of line
7 numbers specifying the starting and ending
8 lines of the picture area in the image, what
9 do those line numbers mean?

10 A. (Document review.)

11 I think you can see, for example,
12 in column 14 around line 46, 47, it states:

13 For each image of the video signal,
14 the letterbox signal detector 46 accordingly
15 outputs a pair of line numbers specifying the
16 starting and ending lines of the picture area
17 in the image, and a signal indicating the
18 presence or absence of a caption.

19 And so it tells you the starting
20 and ending lines of a picture. So if you
21 were to look, for example, at Figure 18, it
22 tells you where the black band on top stops
23 and where the black band on the bottom
24 starts.

25 Q. How does Fujimura identify the line

1 D. Schonfeld

2 where the picture area starts and stops?

3 A. (Document review.)

4 If you look at Figure 19, for
5 example, of Fujimura, it has the bright pixel
6 counter 52, dark pixel counter 56. And if
7 you look at the corresponding discussion,
8 column 14 beginning with -- well, as an
9 example, line 13 it says:

10 To determine where the picture area
11 starts, a bright-pixel counter 52 counts the
12 number of bright pixels as reported by the
13 comparator 50 in each horizontal scanning
14 line.

15 And it goes on through a whole
16 process of making the determination based on
17 the counting of dark and light pixels.
18 I will not go through all of the details.

19 And I'm not sure, by the way, this
20 is at least one example in Fujimura doing it,
21 it might have also done it in other ways or
22 suggested to do it in other ways. And based
23 on other criteria such as histogram, but at
24 least this is the example that came to my
25 mind right now.

1 D. Schonfeld

2 Q. If I could direct you to column 15,
3 lines 9 through 11, does this ID code
4 approach represent another way to detect the
5 starting and ending lines?

6 A. It specifically says it's an
7 alternative based on the EDTV standard.

8 Q. So which approach to detecting
9 letterbox content did you apply in your
10 treatment of Claim 1?

11 A. (Document review.)

12 I'm not sure if I really understand
13 the question. But for the purpose of my
14 analysis of Claim 1, I relied on the
15 letterbox, I relied on Fujimura's disclosure
16 of the letterbox signal detector 46 and the
17 fact it provides a starting and ending line.
18 I don't believe that I took a view that you
19 necessarily needed to limit myself to a
20 particular implementation of the letterbox
21 signal detector. For the purpose of Claim 1,
22 I did not, to the best of my recollection,
23 talk in my declaration in the context of
24 Claim 1 about which the specifics of which
25 the letterbox signal detector was

1 D. Schonfeld

2 implemented.

3 And I think for the purpose of
4 Claim 1 any method would work. In other
5 portions of my declaration, I referred to the
6 counting method for different purposes, but I
7 don't believe it's applicable to Claim 1.

8 I would have to review the -- my entire
9 discussion of Claim 1 again to be certain,
10 but that's my recollection.

11 Q. Let me ask you to turn to column 3,
12 line 63, and more specifically column 4,
13 line 6 through 10. This is the portion that
14 discusses the general purpose processor.

15 Is a GPU, as you mentioned before,
16 is that an example of a general purpose
17 processor?

18 A. So in general, the general purpose
19 processor described here happens to be a DSP,
20 a digital signal processor, but you can in
21 some cases use a GPU, which is a graphics
22 processing unit, as a general purpose
23 processor, but for very specific
24 applications.

25 Q. And before that it talks about an

1 D. Schonfeld
2 application-specific integrated circuit.

3 Is that a general purpose
4 processor?

5 A. No, it is not.

6 Q. Does Fujimura require that any of
7 its elements be implemented on a general
8 purpose processor?

9 A. (Document review.)

10 Fujimura, in the paragraph you just
11 pointed me to, specifically gives at least
12 two alternatives, one which is based on ASIC,
13 an application-specific integrated circuit,
14 and alternatively a general purpose processor
15 such as a single-digital processor, which is
16 what I pointed to in my declaration, the
17 second one, but you do not need to use the
18 alternative, you could use the ASIC, the
19 application-specific integrated circuit
20 instead. But it specifically discloses the
21 use of general purpose processor as a way of
22 such as a digital signal processor as a way
23 of implementing any of the circuits.

24 Q. We're approaching the second hour,
25 but I really just have two or three more

1 D. Schonfeld

2 questions, so I'd have us keep going if
3 that's all right.

4 A. Yes.

5 Q. So I just want to make sure that I
6 understand the construction as applied to
7 Claims 1, 3 and 5 of video signal.

8 So as Fujimura was applied in your
9 declaration to Claims 1 and 3, what is the
10 video signal in Fujimura?

11 A. (Document review.)

12 So the video signal in Fujimura is
13 one or more than one scanning lines.

14 Q. Where -- strike that.

15 So your construction of video
16 signal is a logical unit of video.

17 In what way is more than one
18 scanning line a logical unit of video?

19 A. Well, just like a frame is logical
20 unit of video and more than one frame is a
21 logical unit of video, such as, for example,
22 a scene, and similar here scanning line is a
23 logical unit of video and more than one
24 scanning line would be also a logical unit of
25 video such as a particular region of an

1 D. Schonfeld

2 image.

3 Q. In Claim 1 it talks about a video
4 signal input to an input unit and then later
5 it talks about the video signal.

6 So when you applied Fujimura's
7 teachings to Claim 1, what did you take as
8 the video signal in Fujimura?

9 A. You're referring to which claim
10 limitation?

11 Q. I'm referring to the element in
12 Claim 1, the video signal.

13 A. (Document review.)

14 So from my perspective, I did it in
15 at least two ways. One is to take horizontal
16 scanning line as the video signal,
17 alternatively multiple horizontal scanning
18 line as the video signal.

19 Q. On page 49 of your declaration,
20 this is the second half of paragraph 100.

21 A. Just a second before you ask the
22 question, can I just talk a very quick break?
23 I'll be back in one minute.

24 Q. No problem.

25 MR. KELLY: We can go off the

1 D. Schonfeld

2 record and reconvene in when he gets
3 back.

4 THE COURT REPORTER: We're off the
5 record.

6 (Off the record from 12:20 p.m. to
7 12:22 p.m.)

8 THE COURT REPORTER: We're back on
9 the record.

10 BY MR. KELLY:

11 Q. I'll pick up the question again.

12 So if I could direct you to page 49
13 of your declaration, and this is
14 paragraph 100, the second half of that
15 paragraph. The sentence here is:

16 A scanning line (video signal) that
17 includes part of such a black band,
18 therefore, contains a pattern portion other
19 than contents.

20 What does it mean for a scanning
21 line to include part of a black band?

22 A. (Document review.)

23 So two possible responses: One,
24 the -- it may be a single scanning line, for
25 example, out of the series of scanning lines

1 D. Schonfeld
2 that correspond to a black band, that would
3 be part of a black band as one example.
4 Another example would be when you have
5 something like a -- where you have maybe
6 Fujimura describes the use of captions as we
7 mentioned earlier from column 14, and so it
8 could be a portion of the scanning line
9 corresponding to the black band other than
10 the caption portion.

11 Q. Can a scanning line contain a
12 pattern portion as well as contents other
13 than the pattern?

14 A. Yes. For example, we just spoke
15 about caption, that would be one example of
16 something other than the pattern.

17 Q. Turning next to Claim 3. What
18 element of Fujimura did you apply as the
19 video signal in Claim 3?

20 A. (Document review.)

21 I am not aware that there was any
22 distinction in -- I think I specifically
23 refer to Claim 1 when I refer back in
24 paragraph 121 talking about video signal, so
25 it would still be one scanning line or more

1 D. Schonfeld

2 than one scanning line.

3 Q. And then with Claim 5, what element
4 of Fujimura did you use in your analysis of
5 the claimed -- the video signal?

6 A. (Document review.)

7 In Claim 5, I apply a different
8 mapping to a video signal, in particular in
9 paragraph 138 I state that:

10 Each such frame or image is a video
11 signal.

12 And I discuss it throughout the
13 claim as well as in footnote 1.

14 Q. You said with respect to Claim 1
15 and 3 that the construction or the element
16 you applied is a scanning line or one or more
17 scanning lines.

18 What is the difference between the
19 element you applied in Claim 1 and 3 as the
20 video signal compared to the element you
21 applied as the video signal in Claim 5?

22 A. They are different because if I
23 apply one scanning line, obviously it's not
24 the entire frame. And even when I apply more
25 than one scanning line, I'm really referring

1 D. Schonfeld
2 to only a portion of the frame, not the
3 entirety of the frame; whereas, the video
4 signal for Claim 5 is -- includes the
5 entirety of the frame.

6 Q. What part of Fujimura refers to
7 operating on multiple scan lines as a logical
8 unit of video?

9 A. Well, it talks about operating a
10 letterbox, the starting and ending lines, so
11 it obviously discriminates between scanning
12 lines that occur up to the starting line and
13 then the transition at the end of the ending
14 line for the next letterbox. And my -- I'm
15 not sure that I necessarily need Fujimura to
16 describe what is a logical unit of video, but
17 in my view it's a logical unit of video in
18 this context.

19 Q. Okay. Turning finally to the third
20 ground, the combination of Kim in Fujimura.

21 What would you say is the
22 shortcoming of Fujimura in failing to teach
23 all elements of Claim 5?

24 A. (Document review.)

25 So I wouldn't necessarily

1 D. Schonfeld
2 characterize it as shortcomings, but in my
3 combination analysis for limitation that I
4 refer to as 5E2 and specifically in
5 paragraphs 153 and 154, I rely on Kim because
6 in that case the claim requires that the
7 corrector not correct the video signal when
8 the pattern portions are not the no-picture
9 areas and Fujimura presume aerial focuses on
10 the black letter portion, in which case I
11 rely on Kim, for example, Figure 18 --
12 Figure 1 of Kim to provide a pattern-like
13 image that is not a no-picture area. But as
14 I said, I wouldn't have characterized it
15 necessarily as a shortcoming of Fujimura
16 because Fujimura does disclose having
17 captions where there is no correction applied
18 to the captions.

19 MR. KELLY: Okay. That's the end
20 of my questions.

21 MR. BUERGI: Let's take a quick
22 break.

23 THE COURT REPORTER: We're off the
24 record.

25 (Off the record from 12:34 p.m. to

1 D. Schonfeld
2 12:37 p.m.)
3 THE COURT REPORTER: We're back on
4 the record.
5 MR. BUERGI: I have no questions.
6 We can end the deposition.
7 THE COURT REPORTER: Is DLA
8 ordering a rough draft of this?
9 MR. BUERGI: Sure. Yes, let's do
10 that, please.
11 THE COURT REPORTER: Okay.
12 (Concluded at 12:38 p.m. Eastern Time)
13
14
15
16
17
18
19
20
21
22
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

D. Schonfeld

J U R A T

I, DAN SCHONFELD, do hereby
certify under penalty of perjury that
I have read the foregoing transcript
of my deposition taken on the 7th of
May, 2026; that I have made such
corrections as appear noted herein in
ink, initialed by me; that my
testimony as contained herein, as
corrected, is true and correct.

DAN SCHONFELD

Subscribed and sworn to before me
This _____ day of _____, 20__.

NOTARY PUBLIC

1	D. Schonfeld	
2	-----I N D E X-----	
3	WITNESS: DAN SCHONFELD	
4	EXAMINATION BY:	PAGE
5	MR. KELLY	4
6		
7		
8	-----E X H I B I T S-----	
8	PREVIOUSLY MARKED EXHIBITS	
9	NUMBER	PAGE
10	Exhibit 1001	13
11	Exhibit 1003	14
12	Exhibit 1004	36
13	Exhibit 1005	50
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

D. Schonfeld

C E R T I F I C A T E

STATE OF NEW YORK)
 : SS.:
COUNTY OF RICHMOND)

I, Candida Borriello, a Stenographic
Court Reporter and Notary Public for and
within the State of New York, do hereby
certify:

That the witness, DAN SCHONFELD,
whose examination is hereinbefore set forth
was duly sworn and that such examination is a
true record of the testimony given by that
witness.

I further certify that I am not
related to any of the parties to this action
by blood or by marriage and that I am in no
way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto
set my hand this 7th day of May, 2026.



CANDIDA BORRIELLO

1	D. Schonfeld			
2	ERRATA SHEET FOR THE TRANSCRIPT OF:			
3	Case Name:	Samsung v. Maxell		
	Dep. Date:	May 7, 2026		
4	Deponent:	Dan Schonfeld		
5	Pg. Ln.	Now Reads	Should Read	Reason
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____
10	_____	_____	_____	_____
11	_____	_____	_____	_____
12	_____	_____	_____	_____
13	_____	_____	_____	_____
14	_____	_____	_____	_____
15	_____	_____	_____	_____
16	_____	_____	_____	_____
17	_____	_____	_____	_____
18	_____	_____	_____	_____
19	_____	_____	_____	_____

20 _____
 21 DAN SCHONFELD
 22 SUBSCRIBED AND SWORN BEFORE ME,
 23 This ___ day of _____, 20__.
 24 _____
 25 My Commission Expires: _____

<hr/> <p>(</p> <hr/> <p>(6) 45:12,17</p> <hr/> <p>0</p> <hr/> <p>0 27:6,11,13, 14</p> <hr/> <p>1</p> <hr/> <p>1 13:8 16:22 36:11 40:3, 22 41:23 52:10,14 56:10,14,21, 24 57:4,7,9 59:7,9 60:3, 7,12 62:23 63:13,14,19 65:12</p> <p>10 10:9 57:13</p> <p>100 60:20 61:14</p> <p>100-page 8:24</p> <p>1001 13:12,18,20</p> <p>1003 14:17,20,25</p> <p>1004 36:24,25</p> <p>1005 50:17,20</p> <p>11 56:3</p> <p>11:04 34:19</p> <p>11:14 34:20</p>	<p>12 37:12</p> <p>121 62:24</p> <p>12:20 61:6</p> <p>12:22 61:7</p> <p>12:34 65:25</p> <p>13 32:23 33:7 54:2 55:9</p> <p>138 63:9</p> <p>14 32:25 51:4 54:12 55:8 62:7</p> <p>15 10:9 27:11, 13 28:21 56:2</p> <p>153 65:5</p> <p>154 31:23 65:5</p> <p>16 17:17 27:6 28:20 32:7 40:7</p> <p>16-to-9 17:22</p> <p>18 35:11 54:21 65:11</p> <p>19 23:25 55:4</p> <p>1996 51:5,8</p> <p>1A 20:18</p> <hr/> <p>2</p> <hr/> <p>2 41:3,19</p>	<p>20 39:21</p> <p>2003 37:12,15,17 47:18,22 51:11</p> <p>2004 37:12</p> <p>2004/0156545 37:4</p> <p>2005 14:14 15:8, 13</p> <p>2025 12:3</p> <p>21 32:23 33:7</p> <p>22 30:13</p> <p>23 27:9 28:24 32:24 40:17</p> <p>24 14:14 15:13</p> <p>240dot 23:16</p> <p>29 14:9 23:11, 16</p> <hr/> <p>3</p> <hr/> <p>3 32:25 39:19 57:11 59:7,9 62:17,19 63:15,19</p> <p>30 15:18 22:2 23:11 32:25</p> <p>31 16:17 23:12</p> <p>32 17:7 18:15 19:12,18 23:12 24:22 43:23 44:3,</p>	<p>12,14,16 48:9 49:8</p> <p>33 25:25 26:5 27:21</p> <p>34 38:17</p> <p>35 16:3</p> <p>36 15:10 45:11 48:9 49:7 52:14</p> <p>37 31:23</p> <p>38 31:19 32:24</p> <hr/> <p>4</p> <hr/> <p>4 39:14 42:12 43:22,25 44:14 48:23 57:12</p> <p>4-to-3 17:20</p> <p>40 22:6 31:10 39:18</p> <p>41 31:10 43:25 47:15</p> <p>42 31:10 38:6 45:3 46:19</p> <p>43 26:25 38:13, 24 43:11 44:18</p> <p>44 26:25 30:3 32:8</p> <p>4401 30:16</p> <p>45 32:22</p>
--	--	---	---

46 27:3,5,14 28:14,17 29:14 54:12, 14 56:16	19 16:8,13 17:4,6 18:13 20:9 22:9,16 23:3 26:3 32:17	Acrobat 5:23	alternatives 22:23 58:12
47 27:10 54:12	65 30:13 42:2,6	actual 9:9 19:6	ambiguous 8:20
48 35:12 52:15	67 43:4	added 18:2	amend 13:2
49 32:24 35:22 60:19 61:12	<hr/> 7 <hr/>	addition 16:4	amended 13:9
<hr/> 5 <hr/>	7 30:18 37:11	address 8:8 14:16 16:16 29:10 32:21 53:6	amendments 13:6
5 59:7 63:3,7, 21 64:4,23	7,952,645 13:21 14:24	addressed 28:10	analysis 41:21 45:2, 15 47:11,13 56:14 63:4 65:3
5,808,697 50:19	74 48:10	addresses 52:12 53:21	answer 8:9,15 16:2 19:7 21:11 22:13,24 24:10,19 28:2 29:17 32:13 39:11
50 52:18 54:5 55:13	<hr/> 8 <hr/>	adjusted 39:3 43:16 45:10	answered 34:24
52 55:6,11	80 9:7	adopt 35:23	antitrust 9:23
55 23:25 37:10	<hr/> 9 <hr/>	adopted 22:3	anybody 5:4,17
56 40:15 55:6	9 56:3	advances 51:12	apparatus 15:20 17:10 18:18 19:13, 19 24:25 26:6,20 27:23 39:21
58 51:3 54:5	<hr/> A <hr/>	advantages 28:23	apparent 35:23 45:8
59 53:11	a.m. 34:19,20	aerial 65:9	apparently 36:3
5E2 65:4	above 15:11	ago 9:6	appears 15:5
<hr/> 6 <hr/>	absence 54:18	agree 22:14 38:2 40:9,10	applicable 34:6 45:17 57:7
6 42:24 57:13	abstract 53:15	ahead 14:16	application 5:23 37:3
63 57:12	access 6:4	algorithm 22:22	
64 41:25	accessing 5:12	allow 23:15 33:14	
645 14:12 15:14,	accurately 8:3	allowing 33:17 53:24	
		alternative 56:7 58:18	
		alternatively 58:14 60:17	

application-specific 58:2,13,19	54:12	band 54:22,23 61:17,21 62:2,3,9	62:2,3,9 65:10
applications 50:7 57:24	arrow 42:16	bands 53:18	block 39:19 42:19
applied 28:4,6,12,18 29:13 33:24 59:6,8 60:6 63:16,19,21 65:17	arrows 42:14	based 31:7 35:24 41:10 55:16, 22 56:7 58:12	bottom 27:5 53:15 54:23
applies 44:15	art 11:16 12:18 15:25 36:23 37:16	bearing 14:21	break 34:9,14 60:22 65:22
apply 20:9,13 23:5 27:19 56:9 62:18 63:7, 23,24	artifacts 41:5	begin 35:20	breaks 7:4,10
applying 30:8,10 32:16	ASIC 58:12,18	beginning 16:24 17:16 55:8	bright 55:5,12
approach 56:4,8	asked 7:24 29:17 35:22 51:5	begins 16:24	bright-pixel 55:11
approaching 58:24	asking 5:10 8:12 14:2,4 31:3	believe 24:18 25:14 31:21,22 35:6,8 38:21 49:4 50:8 56:18 57:7	broad 49:25 50:9
area 15:8 19:16 23:16,17 25:12 26:10, 17 27:16,18, 24 28:3,5, 14,19 29:12, 20 30:16 36:8 37:17, 19 53:19 54:8,16 55:2,10 65:13	aspect 17:20,21 38:8 45:4	below 45:13	broadcasting 17:24
areas 9:22 16:21 17:25 18:2 26:8,21 27:20 29:2 65:9	attempt 13:13	besides 7:13	broader 36:4
around 12:3 23:25 30:13 43:4 52:13,15,18	August 37:12	best 8:16 56:22	broadly 9:14 16:2, 10,18,21
	available 13:25 37:6,7 50:22	bet 45:21	BUERGI 34:7,16 65:21
	avoid 40:13	bit 16:2 34:8	<hr/> C <hr/>
	aware 8:9 12:25 13:5 62:21	black 16:21 19:3 26:7,10,16, 21 27:6,24 28:2,13,19 29:2,10,12, 20 30:16 53:19 54:22, 23 61:17,21	cable 5:9
	<hr/> B <hr/>		calculated 52:20
	back 14:5 23:8,20 24:9,22 28:22 34:21 60:23 61:3,8 62:23		calculation 38:16 47:14
	background 17:2		called 4:5 23:4 42:19
	ballpark 10:14		capable 6:14,17

62:6 65:17, 18 case 6:2,5 11:16, 23 12:21 13:3,11 35:4 36:19 47:6 65:6,10 cases 9:7,10,11,14 57:21 caused 41:6 causing 53:2 center 23:17 central 47:19,23,24 48:3 certain 6:4 36:5,20 45:18 46:2, 13 49:11 53:24 57:9 certainly 14:17 certainty 24:11 43:18, 20 chance 8:15 11:12 changed 18:7 51:17 changes 51:16 channel 6:12,13 channels 6:10 characteristi c 27:15 31:24 characterizat ion 15:24	characterize 16:20 26:2,4 33:16 65:2 characterized 65:14 characterizin g 23:23 chat 6:10,16 11:10 14:19 36:24 50:16 choice 48:4 chrominance 52:16,17 53:13 circuit 58:2,13,19 circuits 58:23 circumstances 16:20 cited 44:18 47:15 claim 13:8,9,23 20:18 21:16, 23 22:25 32:4 35:10, 12 36:11 41:23 42:10 46:7 56:10, 14,21,24 57:4,7,9 60:3,7,9,12 62:17,19,23 63:3,7,13, 14,19,21 64:4,23 65:6 claimed 63:5 claims 20:5 21:23 25:18 33:20 35:2,3 36:3 59:7,9	clarification 39:14 clarified 8:21 clarify 8:22 24:20 clean 7:24 clear 23:13 46:13 clearer 23:5 close 38:21 47:24 closer 45:25 code 56:3 collection 22:22 colloquialism 45:21 column 16:22 17:17 23:25 27:9 28:24 30:13 32:23 33:7 52:10,14 54:2,12 55:8 56:2 57:11, 12 62:7 columns 24:7 32:25 combination 64:20 65:3 comes 51:19 communicate 7:6,9,10 communication 6:10,13,22 comparator 55:13 compared 63:20 complete 8:5	completely 46:3 component 48:17 computer 6:21 concepts 10:21 conducted 27:12 confident 45:23 confirm 13:20 15:3 23:20 31:24 confirmed 22:8 connect 6:3 connected 5:7,9 connection 5:25 consistent 20:3,4 25:13 41:18 constant 19:3 constructed 44:4 construction 21:24 32:4,9 33:17 35:10, 13,18,21,23 59:6,15 63:15 construed 32:5 construes 36:3 contained 20:23 21:2, 5,19 30:17 35:14 36:6, 7,15,18 contains 61:18
---	--	---	---

contemplating 41:7	correct 17:12 18:13, 20 19:15,21 20:13,21,24 21:16,17 25:3,5,6,7, 8,20 29:23 32:12,13,19 33:22 34:3,4 36:13,16 40:12 42:22, 23 46:9,19 65:7	correspondenc e 35:5	22,24
content 13:5 18:3,22 19:8,16 20:16 21:20 23:2 24:14 25:6,8 27:10 34:2 56:9	corrected 20:2 21:21 26:9,11,22 27:25 28:3 29:22 47:5	corresponding 17:22 42:9 55:7 62:9	date 14:3,13 37:14
contentions 35:24	correcting 19:16 25:10, 11 32:10,11, 15 33:17	counsel 7:19 12:15 35:23	deal 53:22
contents 17:19 24:4 27:15 42:3,6 61:19 62:12	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	count 9:5	dealing 21:2 43:20
context 37:24 53:23 56:23 64:18	correcting 19:16 25:10, 11 32:10,11, 15 33:17	counted 9:6,13	decide 31:19 42:25
continue 8:12	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	counter 55:6,11	decision 20:8 31:5
continues 53:4	correcting 19:16 25:10, 11 32:10,11, 15 33:17	counting 55:17 57:6	decisions 28:8,10 31:12
contract 10:2	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	counts 55:11	declaration 7:21 10:11 11:7 12:2, 12,18 14:10, 21 15:9,18 16:17 17:3,8 18:16 19:12 24:23 25:25 26:19 27:22 29:21 32:7 35:7,11 37:11 39:10 40:16 41:14 42:2 43:4 44:22 45:16 51:4 56:23 57:5 58:16 59:9 60:19 61:13
contrast 52:24 53:2, 12,13	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	court 4:2 9:20 34:17,21 61:4,8 65:23	dedicated 49:13
control 20:23	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	CPU 30:18 48:14, 16,20,23,25 49:5	define 31:16
controller 20:19 36:11	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	CPUS 49:10,11 52:2,4	definitely 37:25 50:10
controls 20:20 36:12, 15	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	criteria 55:23	degree 46:25
convenience 11:4	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	current 8:8	depending 19:2 33:25 47:9
converted 17:18	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	CV 8:23,24	depends 37:13 46:21
converting 17:19	correction 19:22 20:10 21:9 22:18 24:13 26:23 27:2,4,12, 14,19 28:4, 5,13,17 29:9,12,13, 14 30:4,8,9, 10,18,20,22, 23 31:20 33:14 47:8 65:17	<hr/> D <hr/>	
copies 7:18,24	corrects 15:20 16:9 18:21 19:6,8 20:12 32:6 46:23	D-A-N 4:14	
copy 13:14,16 14:19	corrects 15:20 16:9 18:21 19:6,8 20:12 32:6 46:23	Dan 4:13 14:22	
copyright 9:23	correspond 62:2	dark 55:6,17	
		data 30:4,9,18,	

deposed 9:2,7 10:12	37:23 38:14, 16,25 43:14	disable 23:18 24:13	distortion 53:3
deposition 4:16 5:8 7:7,8,12 8:25 9:11,12 11:3 12:13, 14 13:15 14:11	detector 21:4 31:24 54:14 56:16, 21,25	disables 45:25	district 9:20
depositions 9:9,21,24 11:2	detects 17:10 18:18 19:13,19 21:4 24:25 26:7,20 27:23	disadvantages 28:24	document 13:20 14:8, 21 15:3 16:15 18:14 23:7 28:7 29:25 35:19 37:3,5 41:24 48:7 49:19 50:22 52:9 54:10 55:3 56:11 58:9 59:11 60:13 61:22 62:20 63:6 64:24
derivative 47:24	determination 46:15 55:16	disclose 65:16	documents 6:15 7:14 11:5,13 12:15,16,19
describe 16:13 41:2, 14 42:5 48:5 64:16	determine 55:10	disclosed 48:12,18 49:5	doing 8:11 31:22, 25 51:24 53:9 55:20
described 6:22 17:15 23:2 26:25 38:20 44:8 46:18 57:19	determines 43:17,18	disclosure 37:9 40:25 44:8,23 56:15	download 11:11
describes 27:9 28:21, 23 29:4 30:7 40:6,11 50:7 62:6	device 5:11 7:6 38:17 49:18	disconnected 6:3	downloading 6:17
description 18:9	devices 6:23 50:3,8	discriminates 64:11	drop 36:23 50:16
desirable 18:4	diagram 39:20	discuss 11:5 25:24 41:25 43:10 63:12	dropped 14:19
detail 44:8 52:25	difference 63:18	discussed 23:22 33:7 35:7 50:24	DSP 57:19
details 55:18	different 9:17,22 17:4 19:4 22:22 50:7 51:11 53:10 57:6 63:7,22	discusses 41:17 57:14	duly 4:6
detect 56:4	differently 26:18	discussing 44:19	
detected 18:12 22:17 24:15 27:18 29:11 46:8	difficult 35:16	discussion 35:15 37:22 39:5,8 41:11,13 55:7 57:9	<hr/> E <hr/>
detecting 39:21 49:23 56:8	digital 57:20 58:22	display 24:3	earlier 28:10 34:24 43:11 47:15 62:7
detection 33:8,10,12	direct 56:2 61:12	displaying 6:18	earliest 14:12
	directed 15:23 16:9 49:17 52:8	disputes 10:2	
		distinction 62:22	

easy 18:6	32:17 33:11, 12 35:5	enhancing 41:4,12,14, 17	exceeded 15:11
echoed 17:14 23:22	empty 5:23	entire 20:14 21:14, 20 25:20	exclude 32:18
EDTV 56:7	enabled 24:8 31:17	28:9,12,15 31:5 32:19	excludes 32:16
educational 16:4	enabling 23:13,14 31:18	41:8 46:19 57:8 63:24	executing 48:13
effect 38:13	end 4:24 18:7 40:16 41:3 64:13 65:19	entirety 13:7 25:21 64:3,5	exemplary 39:20 45:9
effective 14:13	ending 54:7,16,20 56:5,17 64:10,13	entitled 16:25	exhibit 11:6,9 13:12,18 14:10,17,20, 25 36:24,25 50:17,20
efficiently 51:25	engage 11:19	equal 30:4,5,9,18 43:15,17 46:3,11,12, 17,22,24 47:6	exhibits 6:20 11:8
either 9:19 44:23 49:10 53:23	engaged 11:23	equally 34:4	experience 9:2 16:4,5,7
electronic 6:4 13:16	English 12:7	equals 38:17,25 39:2 43:6,14 44:11,19,20 47:7	expert 10:5,7,10
element 36:4 41:22 60:11 62:18 63:3,15,19, 20	enhance 40:20 46:25 52:24 53:2	equation 45:12,17	explain 17:13 22:6 36:2
elements 58:7 64:23	enhanced 42:21 44:2 45:11 47:5	equivalent 48:15,16,21, 24 49:12	extent 7:10
eliminated 38:9 45:5	enhancement 23:15 24:3,7 38:9 42:19 44:5,7,10 45:5 46:2 47:17,18 52:16 53:23, 24	essentially 21:11	<hr/> F <hr/>
eliminates 46:4	enhancements 47:3 53:18	estimate 10:14	F-U-J-I-M-U- R-A 50:19
embodiment 17:6,9,16 18:10,11,17, 25 19:9 22:15,20,21, 25 23:4,9, 21,24 24:19, 24 25:15,24 26:3,6,13 27:19,23 29:19 31:9 32:18 33:4, 6,10,24 34:25 39:20 45:9	enhancer 42:15,21 43:23 44:3, 12,14,16 48:9 49:8	exact 9:5 10:6	fact 56:17
embodiments 17:4 31:7	enhances 53:12,13	exactly 11:24 33:19 47:21	factors 31:19
		EXAMINATION 4:9	failing 64:22
		examined 4:7	fair 10:19 21:24 33:16 46:6
			familiar 10:20 11:9 15:7 37:16, 21 51:7

far 8:11	fix 27:12	frankly 25:18 33:3	generated 23:14
February 37:11	fixed 52:18	front 5:14 7:15	give 8:15 11:12
feel 8:19,20	flag 30:4,15	Fujimura 11:18 50:15, 18,25 51:4	giving 4:16
field 15:15 16:11 49:20,21,24, 25 50:10	flagged 30:21	52:6,7,10	glance 13:8
Figure 23:11,16 27:3,14 28:14,17 29:14 30:3 31:19,23 32:23 33:7 39:14,19 40:3,22 42:12,24 43:22,25 44:14 48:23 54:21 55:4 65:11,12	flickering 52:13 53:4	53:5,7,16 54:3,6,25 55:5,20 58:6,10 59:8,10,12 60:8 62:6,18 63:4 64:6, 15,20,22 65:9,15,16	goes 38:12,19 42:14 55:15
Figures 23:11 26:25 31:10 32:24	focused 12:19 16:3	Fujimura's 56:15 60:6	going 8:13 11:4 13:11,12 34:8 36:23 59:2
filed 13:2 37:11, 15 51:2,4	focuses 65:9	full 8:15	good 4:11 11:20
files 6:4,6	follows 4:8	full-video 32:16	GPU 49:13 57:15, 21
filing 14:13 37:14 51:6,11	footnote 63:13	function 49:7	GPUS 51:18,21 52:4
finally 64:19	form 9:19	functional 51:14	gradation 27:11
find 27:8 30:6,11	formed 35:8	functionality 48:12,18,23	Graphic 51:23
fine 34:16	forms 49:13	functions 48:25 52:20	graphics 57:21
finished 4:22	found 35:16	<hr/> G <hr/>	great 4:15 5:4 6:19 7:5 10:24 13:24 15:6 37:8
first 18:8 22:19 35:20,25 43:3	fourth 18:25 25:23 26:2,6 27:18,22 29:19 31:9	gears 50:14	ground 64:20
	frame 12:4 14:7 21:25 22:7, 10,12,14,16, 17 23:6 24:14,15 30:25 31:5 39:24,25 41:8,12,15, 18 46:19 59:19,20 63:10,24 64:2,3,5	general 18:9 37:18 47:25 48:14 57:14,16,18, 22 58:3,7, 14,21	guess 10:7
	frames 40:2 42:8	generally 15:23 19:5 26:12 37:21 39:25 51:13	<hr/> H <hr/>
			half 60:20 61:14
			happy 8:22

hard 7:18	7,13,15,17, 22 40:4,7,9,	64:4	interpret 20:7 21:8 25:17
hardware 48:6,15 49:5,9,10 51:17,24	11,18,19,20, 21 41:4,5 42:13,15,19, 20,22 43:2, 6,8,14,15, 16,19,21,23 44:2,3,11, 14,16 45:6, 7,10,11,12, 20,24 46:14, 16 47:5,6 48:9 49:7,24 54:8,13,17 60:2 63:10 65:13	including 21:20 incoming 39:22 42:4,6 43:7 inconsistent 33:3,13 incorrectly 52:21 indicates 30:3 indicating 54:17 industry 16:7 information 31:8,11 inherently 48:19 49:8 input 20:21,22 27:5,11,13 31:21,23 36:13,14 38:4,10,17 39:6,7,13, 15,16,23 40:4 41:4 42:4,12,18 44:2,16 45:6,11 60:4 instance 43:24 instances 36:5,20 instructions 48:13 integrated 58:2,13,19 intellectual 9:22,25 Inter 14:23 interest 30:6	interpretatio n 22:3,8 33:13 34:3 interrupting 8:14 introduced 13:18 14:25 36:25 50:20 51:18 invention 49:21 52:22, 23 Inventor 50:18 IPR 9:19 10:5, 13,21 11:6 14:20 36:24 50:17 IPRS 10:15 issue 7:20 11:16 12:17 13:11 17:15 28:9 31:2 41:9 53:14 issued 14:4 issues 9:22 10:3 ITC 9:20
<hr/> I <hr/>			
i.e. 30:16 38:17 39:2 43:15	images 23:17 imagine 39:22 implement 48:6,17,22 52:3 implementatio n 50:2 56:20 implementatio ns 51:17 implemented 57:2 58:7 implementing 48:25 58:23 imply 42:17 important 38:8 45:4 include 19:16 42:7 61:21 includes 17:11 18:19 19:14,20 22:4 25:2 32:11 50:2, 11 61:17	integrated 58:2,13,19 intellectual 9:22,25 Inter 14:23 interest 30:6	Japanese 12:10 June 51:4

<hr/> K <hr/>	language 12:8 42:10	59:18,22,24 60:16,18	loosely 32:4
keep 59:2	languages 12:7	61:16,21,24 62:8,11,25	loss 52:25
KELLY 4:10 34:11, 23 60:25 61:10 65:19	laptop 5:13,14	63:2,16,23, 25 64:12,14	lot 9:16 19:4
Kim 11:17 36:23 37:4,8,11, 15,24 38:5 39:5,7,8,12, 14,17 40:3, 6,10,18,24 41:9,10,11, 22 42:12,24, 25 43:9,11, 20 44:18 46:6,18 48:5,8,19 49:5,6,16,20 50:6 52:3 64:20 65:5, 11,12	large 47:9	lines 54:5,8,16,20 56:3,5 59:13 61:25 63:17 64:7,10,12	low 45:19
Kim's 37:22 47:14 51:11	larger 47:10	list 52:23	luminance 29:16 52:17, 24 53:2,12
kind 11:18 43:10 52:11	layperson 10:23	litigation 9:19	luminosity 29:3
know 4:22,24 5:19 8:21 10:6 22:19 33:19, 20 37:4 44:15 47:21 50:21 54:3	left 18:2 23:18 24:6 42:13	little 9:7 21:7 35:16	<hr/> M <hr/>
known 44:6 49:2	letter 65:10	local 52:25	made 31:5 46:15
<hr/> L <hr/>	letterbox 53:22 54:14 56:9,15,16, 20,25 64:10, 14	logical 22:5,6,10 34:9 59:16, 18,19,21,23, 24 64:7,16, 17	maintaining 6:9
labeled 42:21	light 55:17	long 11:22 17:23	majority 9:18 10:3
	likelihood 38:3 45:19 46:13	look 7:25 8:7 11:11,12 18:15 23:10 27:3 30:2,5 37:2 39:18 41:2 43:3,9 44:13,22 45:2 53:14 54:21 55:4,7	make 8:14 14:15 18:5 23:12 29:10 59:5
	limit 56:19	looked 7:25	makes 28:14 34:13 46:13
	limitation 20:18 46:7 60:10 65:3	looking 5:15 24:22 37:8 40:3 49:14 52:6 54:5	making 25:9 55:16
	limitations 21:17	looks 26:14	mall 38:20
	limiting 21:13		map 41:22
	limits 31:11		mapped 27:6
	line 23:25 27:9 30:13 32:24, 25 52:14,15, 18 53:15 54:6,9,12, 15,25 55:9, 14 56:17 57:12,13		mapping 52:19 63:8
			margins 23:18
			mark 18:6
			marked 50:17

markings 8:6	minute 60:23	needed 6:5 56:19	obtained 38:15 44:3
markup 7:22	minutes 34:15	nice 34:10	45:10
matters 10:13	mix 45:11	no-picture 16:21 18:2	obvious 48:22
mean 5:20 10:8,10 19:21 21:6, 8,12,19 22:20 25:18 28:11,15 29:23 31:14, 16 32:19 33:19 34:2 35:17 39:7, 17 47:21 54:9 61:20	mixer 45:10 46:18 48:9 49:7	26:8,10,17, 21 27:16,18, 20,24 28:3, 5,14,19 29:2,12,20 30:16 36:8 65:8,13	obviously 11:25 63:23 64:11
means 19:24 25:4 45:24	mixture 45:22	noise 29:6	occur 64:12
meant 40:8	mobile 49:18	non-picture 53:17	offhand 40:24 41:16
meet 46:7	modem 5:10	nonsensical 20:6,10 24:13 25:16	office 4:20,21 5:3
memory 31:22,25	moment 5:22,23,25 13:19 15:2 34:12	normal 38:17	offset 53:20
mentioned 16:8 57:15 62:7	months 12:4	Northbrook 4:18	Okay 6:6,14,19 7:13,22 8:2 10:24 11:22 12:6,20 13:10 14:15 15:6 17:3 23:2 25:23 32:3 35:9 36:22 37:8 40:3 49:14 50:14,24 54:2 64:19 65:19
met 12:15 15:11	morning 4:11	Notary 4:6	one 14:17 16:5 21:23 22:5 23:21 30:4, 11,15 32:5 38:21,25 39:2,24 42:7,14 43:6,14,15, 18 44:6,11, 19,21,24,25 45:25 46:3, 6,11,12,17, 23,24 47:8 50:3 52:19 53:14 55:20 58:12,17 59:13,17,20,
method 44:5 47:17 57:4,6	motion 13:2	note 43:13	
methods 44:7 47:19 49:23	move 13:10 35:9 36:22	November 14:14 15:13	
mid-1980s 37:20	multiple 60:17 64:7	nowadays 50:4	
middle 24:9 38:7 43:5,11	muted 47:8,10	nuance 26:14	
mind 51:19 55:25	<hr/> N <hr/>	number 9:7,8 10:6, 11 42:13 44:6 53:9 55:12	
minimized 38:9 45:5	name 4:12,13,14 49:7	numbers 11:6,10 54:7,9,15	
	nature 4:19 26:15	<hr/> O <hr/>	
	necessarily 47:19 48:19 56:19 64:15, 25 65:15	objects 52:23	
	need 58:17 64:15		

23 60:15,23 61:23 62:3, 15,25 63:2, 16,23,25 ones 50:4 ongoing 6:13 open 6:7 11:8 37:5,7 50:22 operating 22:10 64:7,9 operations 48:3 51:14, 25 opinion 35:4,8 order 10:9 18:5 ordinary 15:25 output 27:12 28:14 29:15 42:20 outputs 54:6,15 outside 6:10 9:24 owner 10:16,22 13:2 36:2 owners 12:21	paragraph 14:9 15:10, 18 16:3,17 17:7 18:8,15 19:12,18 22:2,6 24:22 25:25 26:5 27:21 32:8, 14,22 35:12, 22 37:10 38:6,13,24 39:9,18 40:7,15,16 41:3,19 42:6 43:4,10,11, 25 44:18 45:3,13 46:19 47:15 48:10 51:3 53:11 58:10 60:20 61:14, 15 62:24 63:9 paragraphs 17:14 41:25 65:5 parallel 51:25 parameter 37:23 38:3, 15,16,25 43:14 paraphrase 30:7 part 18:6 20:16 24:18 28:6 29:8,18 31:12,14 32:11 33:6, 14,18 34:6 40:22 41:12, 15,17,20 42:25 46:20 47:11 49:16 61:17,21 62:3 64:6	Partes 14:23 particular 15:23 16:22 29:5 30:12, 13 33:9 44:4,10 47:16 49:22 51:24 56:20 59:25 63:8 parts 19:22 patent 7:19,20 9:18 10:16,21 12:17,20,25 13:11,21,22, 25 14:3,7,23 15:14,19 16:8,13,23 17:4,6,11, 17,24 18:4, 13 20:9 22:9,16 23:3 25:13,19,21 26:3,13 27:7 29:4 30:7 32:17 33:10 36:2 37:3 50:18,19 51:2 patent's 14:12 17:9 18:17 24:24 26:6 27:22 patent- related 10:3 pattern 18:12,19 19:14,20,24, 25 20:15,22, 25 21:4,9,18 22:16 23:6 24:15 25:2, 5,12 26:7,9, 15,16,21 27:24 29:19	30:17 33:8, 12 35:13 36:6,7,14,17 38:11,24 40:5,22 41:8 61:18 62:12, 13,16 65:8 pattern-like 37:22 38:4, 11,14,15,23 39:2,21 40:7,8,11,19 41:5 43:2,7, 13,15,19,21 45:7,20,23 46:8,14,16 49:23 65:12 patterned 17:25 people 7:6 perfectly 29:10 perform 44:10 performed 48:13,15 performing 44:4 50:12 permutations 19:5 person 15:24 perspective 31:3 60:14 Petition 14:22 petitioner 10:16,21 pick 61:11 picture 16:19 24:2 39:24 53:19 54:8,16,20 55:2,10
<hr/> <p style="text-align: center;">P</p> <hr/>			
p.m. 61:6,7 65:25 page 32:7 35:11 40:17 60:19 61:12 pair 54:6,15 paper 13:14			

pixel 55:5,6	39:12 40:21 53:24 57:5 65:8	problems 16:14 52:7, 11,13 53:5,8	publicly 13:25
pixels 28:18 55:12, 17	POSITA 15:12 48:11, 22 49:2	proceed 11:13	published 37:12
place 27:2	position 22:24	proceedings 9:20	purpose 45:15 46:11 48:14 56:13, 21 57:3,14, 16,18,22 58:3,8,14,21
places 33:2	possible 14:12 61:23	proceeds 30:19 39:4, 23 43:16	purposes 13:15 57:6
please 4:11 13:19 37:2,4 50:21 54:2	possibly 33:4	process 11:3,19 55:16	put 7:11 15:25
point 31:24 42:3 51:13	post 11:10 13:12, 13	processing 15:20 16:6, 9,11,12 24:3 37:19 47:20, 23,25 48:3 49:22,25 50:3,11,12 51:23 57:22	putting 16:8
pointed 41:19 58:11, 16	precisely 49:4	processor 47:23 48:14, 20 57:14,17, 19,20,23 58:4,8,14, 15,21,22	<hr/> Q <hr/>
popular 50:4	preferably 53:18,20	processors 49:6,9,10,13	qualification s 15:12
portable 49:17	preliminary 12:21	professional 16:5	quality 16:19 24:2
portion 18:22 19:8, 24 21:9 24:14 25:19 26:10 27:16 28:25 29:20 30:17 33:25 35:11 46:2,8 57:13 61:18 62:8,10,12 64:2 65:10	prepare 12:14	property 9:22,25	question 4:24 8:8,20 16:2 19:11 22:13 24:10 29:16 31:4 39:15 49:3, 15 56:13 60:22 61:11
portions 17:11,24 18:4,12,19 19:14,20,25 20:15,22,25 21:5,15,18 22:17 23:6 24:4,6,15 25:2,5,7,9, 12 26:7,9, 15,16,21 27:24 29:19 35:14 36:6, 7,8,14,17	prepared 12:13	propose 35:21	questioning 11:14
	presence 54:18	provide 8:15 14:16 65:12	questions 8:13,18 34:25 59:2 65:20
	present 29:6 53:20	provided 21:23 45:13	quick 7:25 8:7 60:22 65:21
	presume 65:9	provides 45:22 56:17	quickly 6:3
	pretty 32:2	Public 4:6	quite 25:17 33:3 46:6
	previous 8:5	publication 37:3,14	
	primary 14:18		
	prior 8:25 10:15 11:15 12:18 36:23		
	priority 14:3,7		
	probably 10:8,12,13		
	problem 60:24		

quote 17:18 22:11 38:6	referred 30:22 57:5	REPORTER 4:2 34:17,21 61:4,8 65:23	reviewing 6:15
<hr/> R <hr/>	referring 13:16 16:22 28:18 37:13 39:9 42:4 51:22 60:9, 11 63:25	represent 56:4	right 6:7 7:8 8:7 18:3 23:18 24:7 28:24 32:2 42:11 45:13 51:7 55:25 59:3
range 27:11,13	refers 48:8 49:6 53:21 64:6	require 20:5 58:6	role 43:22 44:9
ratio 17:20,21	refinement 26:12	required 48:17	room 4:25 5:5 6:23
reached 46:17	region 19:3 29:11 30:24 59:25	resides 18:23 19:9	rough 10:14
read 12:15 14:11 16:18 28:25 32:23 39:12	relate 9:15 33:7,11	respect 23:3 35:3 63:14	rules 11:3,19
reading 32:15	related 9:17,18,25 10:13 50:5 52:17	respectively 36:9	<hr/> S <hr/>
reason 8:2,9 48:21	relates 15:15,19 33:10 38:3 49:21 51:20	response 8:6 12:21	S-C-H-O-N-F-
reasonable 11:21 34:3	relevant 14:7 16:7 45:2 47:12	responses 61:23	E-L-D 4:14
recall 33:9 40:24 41:16 49:3 50:6	relied 56:14,15	restricted 53:19	S4403 30:19
recollection 23:10,19 24:5 25:13 56:22 57:10	rely 44:23 46:10 47:6 65:5,11	result 24:2	S4406 30:19
reconvene 34:15 61:2	relying 45:14	results 40:14	Samsung 11:23
record 4:3,12 8:16 34:18,19,22 61:2,5,6,9 65:24,25	remember 11:24	retained 10:8	satisfied 36:5,19
refer 11:5,17 30:23 32:22, 23,25 52:2 62:23 65:4	removed 53:20	review 12:16,20 13:19 14:8, 23 16:15 18:14 23:7,9 28:7 29:25 35:19 41:24 48:7 49:19 52:9 54:10 55:3 56:11 57:8 58:9 59:11 60:13 61:22 62:20 63:6 64:24	saying 19:18 35:20
reference 50:16	repeated 9:12	reviewed 12:17,23	says 20:12 21:15, 16 23:25 24:23 29:21 38:5,23 39:23 43:12 54:6 55:9 56:6
references 11:15,16 50:25	reported 55:12		scan 64:7
			scanning 55:13 59:13, 18,22,24

60:16,17 61:16,20,24, 25 62:8,11, 25 63:2,16, 17,23,25 64:11 scene 22:11 59:22 Schonfeld 4:1,13 5:1 6:1 7:1 8:1 9:1 10:1 11:1 12:1 13:1 14:1,22 15:1 16:1 17:1 18:1 19:1 20:1 21:1 22:1 23:1 24:1 25:1 26:1 27:1 28:1 29:1 30:1 31:1 32:1 33:1 34:1 35:1 36:1 37:1 38:1 39:1 40:1 41:1 42:1 43:1 44:1 45:1 46:1 47:1 48:1 49:1 50:1 51:1 52:1 53:1 54:1 55:1 56:1 57:1 58:1 59:1 60:1 61:1 62:1 63:1 64:1 65:1 Scott 34:7 screen 5:18,24 7:14 screens 5:14,15 second 29:18 30:11	50:15 58:17, 24 60:20,21 61:14 secrets 9:23 section 16:24,25 17:2 23:4 see 5:25 8:6 18:6 20:11, 18 23:5 26:24 27:5 54:11 seeing 8:23 selectively 52:20 sense 34:13 50:5 sentence 14:12 30:23 36:2 61:15 separate 5:24 separately 20:16 53:13 separates 53:11 separating 53:10 sequence 40:2 series 61:25 serves 42:18 set-up 4:20 sets 18:8 30:18 setting 30:8 seven 10:14 share 6:20	shared 6:15 13:17 shift 50:14 shortcoming 64:22 65:15 shortcomings 65:2 show 27:2 31:17 shown 27:14 31:9, 10 side 7:2 10:16 24:7 sideways 5:15 17:23 signal 15:21 16:10 17:11,12,21 18:19,20 19:14,15,19, 21,23 20:14, 21,25 21:3, 5,14,18,20, 22,25 22:4 23:13,14 25:2,3,10,20 26:9,11,22 27:13,25 28:11,12,16 29:22,24 31:6,13,15, 16,18 32:6, 10,11,16,20 33:15,18,22, 23 34:4,5,6 36:13,17 41:15,23 42:3,5,8,9, 18 46:9 49:22,24 50:2,11,12 52:25 54:13, 14,17 56:16, 21,25 57:20 58:22 59:7,	10,12,16 60:4,5,8,12, 16,18 61:16 62:19,24 63:5,8,11, 20,21 64:4 65:7 signals 19:25 53:17 significant 51:16 silent 6:25 7:3,11 similar 35:14 38:13 52:3 59:22 simply 49:4 simultaneousl y 33:24 single 9:10 21:25 22:16 61:24 single- colored 17:25 single- digital 58:15 situation 27:17 46:5 skill 15:25 slightly 10:11 smaller 10:12 smartphone 6:23,25 solid 27:6 solution 18:13 48:6 solve 53:7
---	--	---	---

solves 16:14	spend 18:24	stopped 24:4,8	take 7:25 11:12
sort 5:11 10:22 35:4 45:20 47:8	spoke 33:11 62:14	stops 54:22 55:2	13:19 14:5 15:2 20:17 34:14 36:10 37:2 60:7,15 65:21
sound 11:20	standard 56:7	strike 49:14 59:14	takes 27:2
Sounds 11:21 13:13	start 19:10	structure 49:12 53:22	taking 4:15 31:20 37:15
Speak 12:6,8,10	starting 32:7 35:12 54:7,16,19 56:5,17 64:10,12	structures 52:4	talk 4:19 39:13 41:2 50:9,15 56:23 60:22
speaking 51:13	starts 54:24 55:2, 11	studied 12:24 40:23 41:9,20	talked 29:15 39:6 52:2
spec 31:25	state 4:11 15:10, 17 17:8 18:16 22:2,7 27:21 35:22 37:10,16 40:15,17 43:5 48:9 51:3 53:11 63:9	study 24:10	talking 29:9 32:4 51:15 62:24
specific 22:21 26:15 31:8,12 46:15 50:7 51:19,20 57:23	state-of-the-art 15:8 51:8,10	subject 22:18	talks 16:18 17:3 27:7 29:6 41:3,6 47:16 49:22 52:11, 12,15,19,21, 22,24 53:3,9 57:25 60:3,5 64:9
specifically 16:23 22:11 27:3 32:21 35:25 38:5 40:6 41:17 50:6,10 51:5 52:11 56:6 57:12 58:11, 20 62:22 65:4	stated 14:9 15:18	submitted 10:10 12:2	taught 26:13
specification 20:12 22:9, 12 25:14 28:21,23 33:20,21	statement 21:13 23:23 25:9,17	subsequent 17:14	tax 10:2
specification	states 17:17 30:14 36:11 39:19 43:24,25 44:10 45:3 49:20 53:16 54:12	suggested 55:22	teach 42:17 64:22
s 20:4	state-of-the-art	suitable 27:15	teachings 60:7
specifics 56:24	stated	summary 16:25 52:22	technical 37:9,17
specifying 54:7,15	statement	superficially 12:22,23	technology 10:2 51:20
spell 4:12	station 17:24	Support 14:22	telephone 49:17
	stationary 18:5	sure 4:13 8:14 9:5,8 14:15 32:2 55:19 56:12 59:5 64:15	telephones 50:4,9,13
	stop 8:13 25:19	sworn 4:6	
		system 40:12,19	
		T	
		table 11:8	

tells 54:19,22	time 8:19 12:3 14:7 24:3 30:6 34:9 48:2 51:6	two 5:13,15,16 45:22 51:18 58:12,25 60:15 61:23	unnatural 52:16
ten 34:15	times 9:4 10:4,14	two-hour 9:10	unrelated 19:23
term 21:22 35:13, 18	timing 31:8,11	type 31:8 40:11 48:3,5 51:24	unwanted 40:13
terms 10:20 32:5 35:14	title 14:21	types 53:5	<hr/> V <hr/>
testified 4:7	today 4:17 6:20 8:4,10 11:4, 20 14:18 24:12	typically 8:25	value 44:15 45:24 46:16,22 47:9
testify 8:3	today's 12:13,14	<hr/> U <hr/>	values 28:22
testimony 24:12	top 54:22	underneath 28:25	variations 18:23 22:23
thing 10:22 16:18	topic 16:10	understand 8:19 10:25 13:21,24 15:15 17:5 32:9 35:17 36:18 39:7, 16 42:16 49:16 52:7 56:12 59:6	various 16:19 18:23
things 9:17 38:13 48:8 53:10	topics 14:18	understanding 31:2 41:10	versus 35:15 51:11
think 8:23 11:8 12:2 16:16, 23 18:8 23:22 26:4 29:4 33:2 34:11,13 38:5 40:25 43:10 50:8 51:5 54:11 57:3 62:22	trade 9:23	understood 48:12	video 15:19,20 16:6,9,10,11 17:10,12,21 18:5,18,20 19:14,15,19, 21,23,25 20:9,14,21, 24 21:2,5, 14,18,20,22, 25 22:4,5 24:13,25 25:3,10,20 26:8,11,22 27:19,25 28:6,11,12, 15 29:21,24 31:6,12,15 32:6,10,11, 19 33:15,18, 22,23 34:4, 5,6 36:13,17 37:19 39:22 41:15,23 42:3,4,5,7, 8,9 43:7
third 17:5,9,16 18:11,17,24 19:9 22:15, 20,21,24 23:4,21,24 24:19,24 25:14 26:13 64:19	treatment 56:10	undesirable 40:14	
third-party 18:9	treats 26:18	undulating 53:3	
thought 47:12	truthfully 8:3,10	unit 20:22 22:5, 12,14 36:14 47:20,24,25 48:2,3 51:23 57:22 59:16, 18,20,21,23, 24 60:4 64:8,16,17	
three 58:25	turn 25:23 35:2 42:24 54:2 57:11	units 22:6,10	
	Turning 12:12 62:17 64:19		

46:9 49:21, 24 50:2,11, 12 52:25 53:17 54:13 59:7,10,12, 15,16,18,20, 21,23,25 60:3,5,8,12, 16,18 61:16 62:19,24 63:5,8,10, 20,21 64:3, 8,16,17 65:7	went 9:8 white 19:3 Wi-fi 5:9 witness 4:5 10:5,7, 10 words 12:11 work 57:4 working 37:18 would've 20:6 48:11, 21 49:2 written 32:10		
view 15:22 20:6, 8,17 21:6,10 25:22 39:25 51:14 56:18 64:17 visible 5:17,22 visiting 12:11			
<hr/> W <hr/>			
wallpaper 16:21 17:25 19:2 26:17 30:3,15,21, 24 want 15:2 22:20 34:14 59:5 way 8:16 20:7 48:24 52:18 55:19 56:4 58:21,22 59:17 ways 55:21,22 60:15 Web 6:2 well-known 48:24	yeah 5:3 7:9,16 13:22 14:5 23:12 28:20 34:11,13 37:24 year 9:6 years 9:12		
	<hr/> Z <hr/>		
	zero 28:15,16,20, 21,22 29:3, 7,16 30:5,9, 19 38:17 44:20,21,24, 25 46:24 47:7 Zoom 5:20,21 6:2, 11,16		