



TP One

Transcript of **Ravin Balakrishnan, Ph.D.**

Thursday, April 3, 2025

Samsung Patent Appeals

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Reference Number: 152109

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

3
4 SAMSUNG ELECTRONICS CO., LTD.,
5 AND SAMSUNG ELECTRONICS AMERICA, INC.,

6
7 Petitioners,

8
9 v.

10
11 MAXELL, LTD.,

12
13 Patent Owner.

14 IPR2024-00867
15 U.S. Patent No. 10,176,848

16
17
18 DEPOSITION OF Ravin Balakrishnan, Ph.D.

19 [Taken by Petitioners)

20 April 3, 2025

21
22 8:57 a.m.

1 Conducted Remotely via Zoom

2 Thursday, April 3, 2025

3

4 Remote deposition via Zoom of Ravin

5 Balakrishnan, Ph.D., a witness herein, called for

6 examination by counsel for Petitioners in the

7 above-entitled matter, pursuant to notice, the

8 witness being duly sworn by JOAN V. CAIN, a Notary

9 Public in and for the Commonwealth of Virginia,

10 taken at 8:57 a.m. EDT, Thursday, April 3, 2025, and

11 the proceedings being taken down by Stenotype by

12 JOAN V. CAIN, Court Reporter and transcribed under

13 her direction.

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1 APPEARANCES:

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1	C O N T E N T S		
2	WITNESS:	EXAMINATION BY COUNSEL FOR	
3	Ravin Balakrishnan, Ph.D.	PETITIONERS	
4	BY MR. ELLISON		5
5			
6	E X H I B I T S		
7	DEPOSITION EXHIBITS		PAGE
8	EXHIBIT NO. 1001	U.S. Patent No.	35
9		10,176,848 B2	
10	EXHIBIT NO. 2030	Declaration of	7
11		Dr. Balakrishnan	
12		Concerning	
13		Patentability of U.S.	
14		Patent No. 10,176,848,	
15		1/30/25	
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1 P R O C E E D I N G S

2 - - -

3 8:57 a.m. EDT

4 April 3, 2025

5 - - -

6 THE COURT REPORTER: Counsel, do you
7 stipulate that I may swear in the witness even
8 though I am not in the physical presence of the
9 witness?

10 MR. ELLISON: Yes.

11 MR. PLUIA: Yes.

12 Whereupon,

13 RAVIN BALAKRISHNAN, PH.D.,
14 having been duly sworn under penalties of perjury by
15 the Notary Public, was examined and did testify as
16 follows:

17 THE COURT REPORTER: Thank you.

18 Please begin.

19 EXAMINATION BY COUNSEL FOR PETITIONERS

20 BY MR. ELLISON:

21 Q Good morning, Dr. Balakrishnan.

22 A Good morning.

1 Q I'm Martin Ellison. I'm the counsel for
2 the Samsung petitioners. We've met before.

3 A Yes, virtually.

4 Q And you have been deposed before, correct?

5 A Yes.

6 Q Is there any reason you can't give your
7 best testimony today?

8 A Not that I know of.

9 Q Where are you right now?

10 A I'm in the -- in a board room in the
11 offices of Mayer Brown in Washington, D.C.

12 Q Is there anyone else in the room with you?

13 A No.

14 Q And you're at a computer, correct?

15 A I am.

16 Q Apart from the video conference application
17 that this deposition is taking place on, do you have
18 any other applications running on your computer?

19 A I have my email application running,
20 mainly, so that I have the email with the link for
21 the Zoom call handy, so I can fire it up if it dies
22 in between; but if you want me to close it, I can do

1 that.

2 Q That's fine. You can leave it open. Thank
3 you.

4 Do you have any other devices in front of
5 you?

6 A Nope.

7 Q Do you have any hard copy documents with
8 you?

9 A I do not.

10 Q All right. Thank you.

11 A I do have a pad of blank paper here, but --

12 Q Okay. That's fine. Thank you for letting
13 me know.

14 I'm going to place in the Chat an
15 Exhibit 2030 in thigs IPR proceedings: This is a
16 declaration you submitted.

17 Can you please let me know when you see it
18 and download it?

19 A Yeah, I see it. I'll download it.

20 Q Thank you.

21 - - -

22 [Deposition Exhibit 2030 was

1 presented to the witness.)

2 - - -

3 THE WITNESS: Okay. I have downloaded it,
4 and I have it open on my computer.

5 BY MR. ELLISON:

6 Q Can you confirm this is the declaration you
7 submitted in these IPR proceedings?

8 A Yes. From a quick skim through the PDF, it
9 appears to be the declaration, yes.

10 Q You wrote this declaration?

11 A Yes.

12 Q Do you consider this declaration to
13 accurately describe your opinions in your own words?

14 A It definitely describes my opinions. Some
15 of the words come from various things like the
16 patents and prior art and whatnot, so not every word
17 in there is from me, but this definitely covers my
18 opinions.

19 Q And everything in the declaration is true
20 and accurate, to the best of your knowledge?

21 A Yes, but if I notice anything, like a typo
22 or anything, I'll let you know if we come to it.

1 Q Thank you.

2 Now, your declaration includes references
3 to other materials, like definitions you cited for
4 mode and filter, for example; is that right?

5 A That's correct.

6 Q Did you locate those materials yourself?

7 A Which ones?

8 Q Well, for example, the dictionary
9 definitions that you cited for mode.

10 A The mode one, I may have -- at least, I'm
11 not sure if the one I found ended up in here. Some
12 of them I looked for and some of them counsel looked
13 for, so I don't recall exactly which ones ended up
14 in the declaration, like, the source of the ones
15 that ended up in the declaration, but there's
16 definitely a -- you know, I did a bunch of searching
17 myself.

18 Q Can you go to page 40 of your declaration,
19 and it's paragraph 77. Just going forward, for your
20 reference, when I say the page number of a document,
21 I'm going to refer to that bottom-right page stamp
22 of the document where, for example, it says: "Page

1 40 of 145."

2 Do you see that?

3 A I got you, and it happens to correspond to
4 the PDF page, which is convenient. Thank you.

5 Q Okay. So you're looking at paragraph 77
6 right now, right?

7 A I am.

8 Q All right. There are two -- there's a
9 table in paragraph 77 with two definitions each, for
10 filter and mode.

11 Do you see that?

12 A I do.

13 Q All right. And there are two sources
14 identified there?

15 A Right. The one from PC Magazine, the other
16 one from the McGraw-Hill dictionary.

17 Q Were there other definitions of mode that
18 you looked at, but did not make it into your report
19 in this table?

20 A I don't recall. I can't think of one
21 offhand. Certainly, if there were ones, I don't
22 think it conflicted or said anything different.

1 Q Okay. I'm trying to understand because,
2 before, you testified that some definitions you
3 looked for, some counsel looked for, and you don't
4 recall exactly which definitions ended up in the
5 declaration.

6 Do you remember saying that?

7 A I do.

8 Q Okay. Did you only look at these two
9 dictionary definitions or definitions that are cited
10 in paragraph 77, or was there something else that
11 you had in mind when you testified to that earlier?

12 A I had looked at -- I had looked at other
13 things, but I'm just saying that none of those, to
14 the best of my recollection right now, said anything
15 substantively different. So I think these two seem
16 to make sense.

17 Q Do you recall what the other things were
18 that you looked at?

19 A No, not offhand, and I didn't keep a
20 record.

21 Q The two that made it into the declaration,
22 were those ones that you found, or ones that counsel

1 found?

2 A I don't recall the genesis of the ones that
3 made it into the declaration.

4 Q Did you consider any other materials that
5 are not cited in your declaration?

6 A Not for the substance of my opinions here.

7 Q Would you go to page 17, please, of your
8 report?

9 A I am there.

10 Q All right. There's a discussion here that
11 begins on page 17 about the ordinary level of skill
12 in the art.

13 Do you see that?

14 A I do.

15 Q And it includes, within this section, I
16 believe, paragraph 41, your definition of a person
17 of ordinary skill in the art?

18 A Yes.

19 Q What kind of technical capabilities would a
20 person with the experience you identified in
21 paragraph 41 possess?

22 A Well, they would have what I say in

1 paragraph 41: "...a working knowledge of image
2 recording...reproduction...face recognition
3 technology," and, you know, some of the basic things
4 that anyone with an undergraduate bachelor's degree
5 in computer science or electrical engineering or
6 equivalent would have of the ability to understand
7 how to program things; for example, using computer
8 programming languages, the ability to understand
9 circuit diagrams within some amount of reason, to
10 understand basic user interface concepts.

11 I think I'll stop there.

12 MR. PLUTA: Excuse me, Martin. Can we go
13 off the record for a second.

14 MR. ELLISON: Yes, no problem.

15 [Discussion off the record.]

16 BY MR. ELLISON:

17 Q So a person of ordinary skill in the art
18 with the background you described in paragraph 41
19 would be able to read and write source code,
20 correct?

21 A I think that's fair, yes.

22 Q And they could program a device to execute

1 functions similar to the ones that are claimed in
2 the '848 patent claims?

3 A Given a specification for that, they should
4 be able to implement it.

5 Q What does that mean, "given a specification
6 for it"?

7 A If you tell the person of ordinary skill in
8 the art, "This is what I'd like you to implement,"
9 they would have the toolkit or the toolset to
10 implement it, but the act of the inventive step of
11 coming up with the invention in the first place,
12 that's, I think, a separate discussion.

13 Q Okay. Understood.

14 So I just want to -- if they had the idea
15 that they wanted to implement face detection in a
16 device, they'd be able to program that device to
17 execute face detection, right?

18 A If the device had sufficient capabilities
19 to do it, sufficient processing power, memory, et
20 cetera. So, you know, you can't do face detection
21 on any device. It really depends on the
22 capabilities of the device.

1 Q Okay. I get that. Let's assume they want
2 to do it on a device that has sufficient
3 capabilities. They would be able to program it to
4 execute that function, correct?

5 A They should be able to, given the
6 specification of what type of face detection to be
7 done, et cetera. There's face detection and there's
8 face detection. So the most sophisticated types of
9 face detection might require more specialized
10 expertise, but if you implement a textbook face
11 detection algorithm, then, yes, I think a person
12 with this level of skill in the art should be able
13 to do it in a device that had the right, appropriate
14 compute capabilities.

15 But that doesn't mean that if the device is
16 already kind of locked down, has already got code on
17 it that's, you know, flashed on the memory and et
18 cetera, then adding stuff to something that's locked
19 down is a much more complex situation. So in that
20 situation, I think it may or may not be possible for
21 one of skill in the art to easily do it.

22 Q Could a person of skill in the art, as

1 described in paragraph 41, install the hardware
2 components in these devices, like a processor and
3 memory, and connect them to each other?

4 A Not necessarily. Because a lot of those
5 things are done in a factory. Some are done by
6 someone after the fact.

7 Q A person of ordinary skill in the art, as
8 described in paragraph 41, could read and write
9 source code, though, correct?

10 A Yes, I agree with that.

11 Q If you'd go to page 31 of your report,
12 please.

13 A Yeah, I'm there.

14 Q This is the claim language of the
15 challenged claims broken out into element number
16 limitations.

17 Do you see that?

18 A I do, and it goes on for a few pages, yes.

19 Q All right. Thank you.

20 I'm going to be referring to these
21 limitations throughout the deposition, according to
22 this list; is that all right?

1 A Sure.

2 Q All right. Now just looking at claim 8,
3 the word "reproduce" --

4 A I'm sorry. One second. Okay. I'm at
5 claim 8. Thank you.

6 Q The word "reproduce" or "reproducing" is
7 used in claim 8, correct?

8 A Yes.

9 Q For example, I see it in limitation 8.f.

10 A Yes.

11 Q What does it mean for a device to reproduce
12 image information?

13 MR. PLUTA: Object to form.

14 THE WITNESS: In the context of this claim,
15 the way I read it or one of skill in the art would
16 read it would be to take the recorded information
17 from the recording medium and display it or show it
18 in some fashion to reproduce it.

19 BY MR. ELLISON:

20 Q Does it need to be displayed in order to be
21 reproduced?

22 A I think, in the full context of the claim,

1 I think it would have to be. Because without it
2 being displayed, the selection steps later on cannot
3 easily be done.

4 So I would say, yes.

5 Q Can you explain that answer, please?

6 A I think I said it already. If I'm
7 reproducing the record image without displaying it,
8 then how do I do the selection step?

9 For example, 8, the second-to-last step,
10 where a person with a face and image information is
11 selected, et cetera. So --

12 Q You're referring to limitation 8.i?

13 A Actually, hang on one second. I just want
14 to make sure.

15 Correct that answer. So I think it could
16 be that you can do this claim without actually
17 displaying the reproduced information, but it
18 certainly does not preclude reproducing the recorded
19 information.

20 I think that's the more complete way to
21 answer that.

22 Q But you are essentially recalling the image

1 information from the device's memory?

2 A That part has to happen, yes. It's
3 reproducing -- well, I think you used the word
4 "recall," but I would say reproducing, reading the
5 recorded image information from the device's
6 recording medium, which I think you said -- you
7 referred to that as memory, which I think is fine,
8 generally.

9 Q So reproducing would be reading the
10 recorded image information from the device's
11 recording medium?

12 MR. PLUTA: Object to form.

13 THE WITNESS: At least in part. It could
14 also include displaying it after reading it.

15 BY MR. ELLISON:

16 Q Okay. And when you say, "displaying it
17 after reading it," do you have to display the image
18 as, like, the full image or, if I'm displaying the
19 thumbnail, am I reproducing it?

20 A If the thumbnail is the recorded image,
21 then I am reproducing it.

22 Q In limitation 8.1, it says: "Selectively

1 reproduce the recorded image information..."

2 Do you see that?

3 A I do.

4 Q What does it mean to "selectively
5 reproduce"?

6 A The way I read that is it reproduces the
7 recorded information that includes the registered
8 specific person that was registered in the earlier
9 steps. In other words, don't just reproduce
10 everything in the recorded medium, but reproduce
11 ones that meet this criteria.

12 Q Let's say a user of a device selects a
13 picture that's saved to the device's memory that
14 includes a registered person. Is that selectively
15 reproducing the recorded image information,
16 consistent with limitation 8.i?

17 A Can you repeat that question or have the
18 court reporter read that back, please? I'm not sure
19 I understand.

20 Q I'm happy to.

21 A Thank you.

22 Q Let's say you have a user of a device who

1 selects a picture that's saved to the device's
2 memory and that picture includes a registered
3 person. Is that selectively reproducing consistent
4 with limitation 8.i?

5 A So I think that would depend on whether the
6 earlier steps have also already been done. If the
7 user just happens to select an image that happens to
8 have already been registered, then I don't think
9 that is meeting the entirety of the claim.

10 Q Why is that?

11 A Because the claim requires all these other
12 steps to be done. It's not just 8.i, and, also, the
13 claim doesn't say that the user has to do the
14 selection.

15 So if the user randomly picks an image from
16 a stack of images that have -- and one of them
17 happens to be a registered specific person, that's
18 kind of serendipity. The claim requires that all
19 these steps -- all of those be done in order to meet
20 the claim.

21 Q Okay. I want you to envision an embodiment
22 of the device that performs all of the limitations

1 of claim 8.

2 Do you understand?

3 A (Nodding.)

4 Q So similar to an embodiment described in
5 the '848 patent specification itself, I would assume
6 it would be your position?

7 A Sure. I think I'm following along, yes.

8 Q So this device has already registered a
9 person, captured a picture of the person consistent
10 with the limitations 8.pre through 8.h.

11 Does that make sense?

12 A Okay. I'm following.

13 Q All right. Now, this device has a bunch of
14 pictures stored on its memory, including pictures of
15 the registered person.

16 Does that make sense?

17 A Sure.

18 Q If a user of this device selects, from all
19 of those stored images, a picture of the person they
20 previously registered to reproduce, would that be
21 selectively reproducing the recorded image
22 information consistent with 8.i?

1 A I think if the user's simply picking one
2 that happens to be registered previously, I don't
3 think that meets the claim because this is -- the
4 system is selectively reproducing the recorded
5 information, which includes the registered specific
6 person.

7 So I don't think this covers the situation
8 where a user happens to pick a picture and that
9 picture happens to be registered previously, and
10 that's just a random -- randomly, the user's picked
11 a picture that may have been registered.

12 Q What if the user is intentionally searching
13 for and selecting a picture of a person that they
14 previously registered? Does that change your
15 opinion as to whether 8.i would be met?

16 MR. PLUTA: Object to form.

17 THE WITNESS: I haven't considered that
18 because now we're getting to user intent, which I
19 haven't considered as part of my analysis here for
20 this IPR.

21 BY MR. ELLISON:

22 Q I didn't intend -- excuse the additional

1 use of that word. That was not really where I
2 wanted to go, but you're saying you don't think that
3 the situation I described covers limitation 8.i when
4 a user happens to pick a picture. So it seems to me
5 like you're implying that there's some sort of an
6 intent requirement here to meet the selectively
7 reproduced limitation.

8 MR. PLUTA: Object to form.

9 THE WITNESS: I'm saying, to meet this
10 limitation, a user doesn't have to do the selection.
11 It can be done by the system. That's, I think, my
12 point.

13 BY MR. ELLISON:

14 Q Okay. The limitation can be met by the
15 system, right?

16 A Yes.

17 Q Can the limitation also be met by the user?

18 A Perhaps, if they do the entirety of the
19 claim with the system, obviously. I think the point
20 I'm trying to make is, just because the other parts
21 of the claim have been done at some point in the
22 past and the user goes in and randomly try to pick a

1 random picture, then it's not selectively
2 reproducing, which includes this registered specific
3 person. I think there has to be a reason why this
4 registered specific person actually is included by
5 the system in their pick.

6 Q There has to be a reason why the registered
7 specific person's image is being reproduced; is that
8 right?

9 A Right. Because it's selectively
10 reproduced, then it has to include the registered
11 specific person.

12 Q Okay. So what actions could a user take to
13 selectively reproduce the recorded image information
14 consistent with 8.i?

15 MR. PLUTA: Object to form.

16 THE WITNESS: So they could say, for
17 example, "Pick" -- "Give me the name of the" --
18 "Give me all the pictures for this person with the
19 registered name," and then that would come up, the
20 registered specific person should show up so that --
21 and the ones who are not registered may not show up.

22 BY MR. ELLISON:

1 Q Okay. So you're talking about running some
2 sort of a search on the images that are saved in
3 memory?

4 A Sure, in part, right?

5 Q What's the other part, beyond just running
6 a search on images saved in memory?

7 A Well, it has to actually reproduce it and
8 do all the other things. It's not just searching.

9 Q Now, does the search that you're describing
10 have to be for the person's name?

11 A Not necessarily.

12 Q So it would just be a search that returned
13 the recorded image information that includes the
14 registered specific person?

15 A It should.

16 Q Could that search be a search that returns
17 all of the images that are stored on the device?

18 MR. PLUTA: Object to form.

19 THE WITNESS: If all the images are -- have
20 the registered specific person, yes.

21 BY MR. ELLISON:

22 Q So all of the images returned by the search

1 have to have the registered specific person in order
2 for 8.1 to be met?

3 A Yes -- well, not all images that are
4 stored. All the images that are returned would have
5 to include the registered specific person. Because
6 they say: "Selectively reproduce the recorded image
7 information which includes the registered specific
8 person."

9 The whole point of being selectively
10 reproducing is to include this registered specific
11 person.

12 Q If a search returned nine pictures, eight
13 of which had the registered person in it, wouldn't
14 that be selectively reproducing the recorded image
15 information, which includes a registered specific
16 person?

17 A Except it's -- are you saying one of them
18 doesn't have the specific -- registered specific
19 person?

20 Q Yes.

21 A Then why would it be returned, if I'm
22 selectively reproducing?

1 Q Well, I'm trying to understand what
2 selectively reproduce means, in your mind, and
3 whether that just means you're offering some sort of
4 selective process that returns a registered specific
5 person or returns only the registered specific
6 person.

7 A Well, I think it wouldn't make much sense
8 to return a random set of -- random set of pictures,
9 some of which happen to have the registered person.
10 Then what's the criteria by which you're selecting?
11 It's almost a random criteria.

12 Q Can you look at limitation 11.b on page 31?

13 A Yeah, I'm there. Give me a moment to read
14 it, please.

15 Q That's fine.

16 A Okay.

17 Q In 11.b there's a reference to:
18 "reproducing time."

19 Do you see that?

20 A Yes.

21 Q What is a reproducing time?

22 A The time required to reproduce the image

1 information.

2 Q Are you talking about the processing time
3 necessary to reproduce, or is it the runtime of the
4 reproduced information?

5 A What do you mean by "runtime"? You mean
6 like a video -- if it's a video, you're playing back
7 5 seconds of it?

8 Is that what you mean?

9 Q Yeah, that could be an example.

10 A I think that'd be, certainly, the -- you
11 used the word "runtime," as you just defined it, as
12 an example, yes. That would be the reproduce --
13 would encompass the reproducing time, which would
14 include the processing time because I can't -- I
15 can't play back something without processing it, so
16 it's kind of intertwined.

17 So if -- for example, if I showed five
18 images one second apart, it's going to take 5-plus
19 or 4 seconds of delay, so -- but it includes the
20 processing time.

21 Q Okay. So earlier we were talking about the
22 word "reproduce."

1 Do you remember that?

2 A Yes. In generalities, yes.

3 Q Okay. And the word "reproduce," you -- I
4 believe you agreed, would be reading the recorded
5 image information from the device's recording
6 medium, right?

7 A In part, yes.

8 Q Okay. And that could include, but did not
9 necessarily require, also displaying the image
10 information?

11 A That's correct.

12 Q And then selectively reproducing would be
13 some sort of search that returned the image
14 information with the registered specific person,
15 right?

16 A The image information that includes the
17 registered specific person. So it doesn't preclude,
18 like, the image has another person in it, but also
19 has the registered specific person, that could be
20 incorporated as well.

21 Q Okay. So with those understandings in
22 mind, let's say you have a device and you searched

1 for and reproduced image information that consists
2 of five photographs of the registered person.

3 Do you understand that scenario that I'm
4 describing?

5 A I have that in mind.

6 Q What would be the reproducing time in that
7 situation?

8 A If it is displaying it, then it's
9 displaying all five of them at the same time, then
10 it would be the time taken to put that on the
11 screen -- to retrieve it from the storage medium and
12 to put it on the screen.

13 If it's displaying it one image after
14 another temporally, in other words, in sequence,
15 then it would be the total time taken to do that
16 entire sequence.

17 Q So if the device is displaying all five
18 images at the same time, the reproducing time is the
19 processing time necessary to retrieve the images
20 from the storage medium and put it on the screen?

21 A And put it all on the screen, the totality
22 of it, then it's already been reproduced; everything

1 is there. And if it's there for ten hours, I would
2 not say the reproducing time is ten hours. The
3 thing is, at the moment it's displayed, then I would
4 leave it at the point it's displayed; we're done.

5 But if it happens to then switch and
6 another set comes up and another set comes up, then
7 the reproducing time would be for each of those
8 sets.

9 Q So in this context, the reproducing time
10 doesn't have anything to do with the time duration
11 of the image information that you actually
12 retrieved?

13 A I'm not sure I understand that image you
14 retrieve -- what do you mean by the time duration of
15 an image?

16 Q Okay. Well, let's say we were returning
17 five videos instead of five images. Okay?

18 A I see.

19 Q The reproducing time doesn't have anything
20 to do with the length of the videos, it has to do
21 with the processing time necessary to bring them up
22 and make them accessible on the screen?

1 A No, I disagree with that because, in the
2 five videos, you're going to have to reproduce the
3 five videos, one after the other. So the length of
4 the videos would be part of the -- would be included
5 in the totality of the time. So it's not just
6 retrieve the link to the video; it's also the
7 playback of the video. You actually have to
8 reproduce the video.

9 Q I thought we agreed that reproduce didn't
10 require displaying?

11 A Well, even if I didn't display it, a
12 different length video is going to be of a different
13 amount of data, so it's going to take a different
14 amount of time to reproduce.

15 Q Well, that's what I'm trying to understand.
16 Is it the processing time needed to put the video up
17 on the search result, or is it the reproducing time
18 having to do with the actual duration of the video?

19 A Either one. Because even putting it up,
20 I've got to retrieve it. If I retrieve a 1-minute
21 video versus a 5-minute video, it's going to take
22 longer to retrieve a 1-minute video than it is to

1 retrieve a 5-minute video [sic]. And then, if I
2 play it, it's also going to take -- one's going to
3 be shorter than the other.

4 So even interpretation is going to be a
5 different amount of reproducing time if the videos
6 are of different length.

7 Q Why is a 1-minute video always going to
8 take less time than a 5-minute video to reproduce?

9 A I didn't say always. Maybe if I did, I
10 misspoke. It depends on the encryption, et cetera,
11 the format in which it is stored. But assuming if
12 two videos encoded in the same format, same data
13 structures and everything, a 5-minute video is going
14 to have more data than a 1-minute video, and as a
15 result, it's going to take more processing time,
16 more disc reading time to retrieve that information.
17 And then, if you then play it, it's also going to
18 take more time for the 5 minute than the 1 minute.
19 I think that's pretty obvious.

20 I'm sorry. I think the lights just went
21 off because there's not enough motion in the room.
22 So I don't know if you care. Well, it's a little

1 dark. Maybe we can go off the record and I can move
2 around a little bit.

3 MR. ELLISON: That's fine. Yeah, we can go
4 off the record.

5 [Recessed at 9:43 a.m.)

6 [Reconvened at 9:43 a.m.)

7 MR. ELLISON: I'm going to place in the
8 Chat Exhibit 1001, which is the '848 patent.

9 - - -

10 [Deposition Exhibit 1001 was
11 presented to the witness.)

12 - - -

13 BY MR. ELLISON:

14 Q Can you please let me know when you've
15 downloaded it and can view it?

16 A Yes, I have it. I have it on my screen.

17 Q If you'd go to column 8, which is on page
18 18 of Exhibit 1001, you'll see, near the very bottom
19 of column 8, a section on the reproducing method
20 disclosed in the patent.

21 Will you let me know when you see that?

22 A Yes, I'm there.

1 Q This is the beginning of the portion of the
2 patent specification that discloses reproducing
3 modes, right?

4 A This is one part of it. I just want to
5 make sure -- well, I'll just say, yes, this is a
6 part of the patent that talks about reproducing
7 methods using chapter levels.

8 Q All right. And this discussion of the
9 reproducing methods corresponds to, in your opinion,
10 the reproducing modes that are claimed in 11 --
11 claims 11 and 12 -- right? -- among other claims?

12 A This is one embodiment, yes.

13 Q Are there any other portions of the patent
14 that you're aware of that disclose reproducing
15 methods that correspond to the reproducing modes
16 claimed in 11 and 12?

17 A I believe this is the embodiment that I'm
18 relying on.

19 Just to note that it goes on for a couple
20 of pages, so it's not just that first paragraph. I
21 think that's pretty obvious.

22 Q And in this embodiment of the patent, are

1 these modes disclosed as reproducing video files or
2 image files?

3 A I think it can cover both. It can cover
4 the situation where these chapters are stored as
5 particular sets of images that are played back or it
6 could be stored as a video.

7 So I think it covers both situations.

8 Q Where in the specification are you seeing a
9 disclosure of chapters stored as particular sets of
10 images that are played back or things stored as
11 video?

12 A So, for example, on -- I'll get the column
13 number correct here -- column 9 -- sorry -- column
14 9, line 29 onwards talks about reproducing mode as
15 an express reproducing mode. The video camera
16 reproduces, first, the chapter -- having a
17 chapter -- so particular chapter, then Chapter 2,
18 Chapter 3, et cetera.

19 I think one of skill in the art reading
20 this could see it as a -- see each chapter is a
21 portion of a video, stored as a video. They could
22 also be still images that are shown in sequence. I

1 think one would understand that either one could be
2 covered by this claim.

3 If you're asking is the word "image" in
4 sequence -- is the phrase "image in sequence" shown
5 in these paragraphs? I think the answer is no, but
6 I'm reading this as one of skill in the art trying
7 to understand what such reproduction could cover,
8 and I think it covers both situations.

9 Q So in your opinion, a person of skill in
10 the art would see the word "chapter," and think,
11 "This could be a portion of video; this could also
12 just be an image"?

13 A Could be a sequence of images, and a
14 sequence could be just one image. Chapter 1 is one
15 image, Chapter 2 is another or a set of key frames
16 of multiple images off of video, what's stored as
17 individual images.

18 I think that covers more than just a video.

19 Q Okay. Let's -- let's assume for now that
20 each of these chapters corresponds to a single still
21 image.

22 Does that make sense?

1 A I think I'm following your hypothetical.

2 Q Well, this is the -- it's not just my
3 hypothetical, right? You're saying -- I thought you
4 just told me that each chapter could be read as a
5 sequence of images and a sequence could just be one
6 image.

7 Did I misunderstand you?

8 A I don't think you did.

9 Q Okay. So I'm not giving you, really, a
10 hypothetical. I'm just repeating back to you what
11 you're saying the specification says.

12 MR. PLUTA: Object to form.

13 THE WITNESS: Fair enough. Okay.

14 BY MR. ELLISON:

15 Q Right. So --

16 A I think what I meant to say was, you know,
17 I understand the scenario -- hypothetical maybe is
18 the wrong word -- the scenario you're talking about.

19 Q In this instance where each chapter is a
20 single, still image, show me in the '848 patent
21 where it's disclosing the reproducing time being
22 different for each of those chapters.

1 A Well, If I have five chapters, then five
2 chapters is going to be different than three
3 chapters.

4 Are you saying per chapter, it's not
5 different? I just want to make sure I understand
6 the question.

7 Q What do you mean by five chapters are
8 different than three chapters?

9 A Well, if you're saying I'm going to
10 reproduce five chapters as opposed to reproduce
11 three chapters, then I think, by definition, each
12 one of those are going to be different reproducing
13 times. But if only doing one chapter at a time,
14 then each -- and if each chapter only has one image,
15 then, generally, the reproducing time should be the
16 same for each of those.

17 If I'm doing multiple chapters versus one
18 chapter, then it would be different.

19 Q The reproducing time being what?

20 A I've gone over this. Reading the data and
21 either displaying on the screen or -- in the
22 situation where there is a display.

1 Q Okay. Let's say I display on the screen
2 two images. Would that have a longer reproducing
3 time than displaying on the screen one image?

4 A Yes, typically.

5 Q Why?

6 A Because it takes more time to read two
7 images than it takes to read one image. Now, that
8 assumes that both images are of the same size, et
9 cetera. When I say, "size," I mean same amount of
10 storage. If I have a 1-gigabyte image and the other
11 one's a 1-kilobyte image, then they would take
12 different times.

13 Q Can you go back to your declaration,
14 please, Exhibit 2030, and let me know when you're
15 there?

16 A Yeah, I'm there.

17 Q I want to go to limitation 11.c, and that's
18 the top of page 32.

19 A Yeah, I'm there.

20 Q All right.

21 A Sorry. I heard something.

22 THE COURT REPORTER: I coughed. I'm sorry.

1 THE WITNESS: Okay. Sorry. I wasn't
2 looking at the Zoom screen. I was looking at the
3 document, so I didn't have the context.

4 BY MR. ELLISON:

5 Q Now, this limitation is pretty long, and
6 the wording is probably not ideal, but the way I
7 understand it, it's describing the two reproducing
8 modes as reproducing some overlapping image
9 information, but, also, image information that's
10 different between the two modes.

11 Is that a fair characterization?

12 MR. PLUTA: Object to form.

13 THE WITNESS: Let me try to digest what you
14 just said and map it to the claim.

15 So I think I'll phrase it as, in the second
16 mode, it includes the information reproduced in the
17 first mode and, in addition, some other stuff that's
18 not reproduced in the first mode.

19 I think that corresponds to what you said,
20 but I prefer to go with what I just said.

21 BY MR. ELLISON:

22 Q That's great, and that works for me. Thank

1 you.

2 What I'd like to understand is, in the
3 context of the '848 patent and the chapters being
4 individual still images, how would this limitation
5 be met by the embodiment?

6 MR. PLUTA: Object to form.

7 THE WITNESS: Well, there, if I'm doing,
8 say, the superexpress mode in the embodiment,
9 superexpress reproducing mode, it would show me the
10 first chapter Level 1 and then, et cetera, et
11 cetera, all the Level 1s. But the second embodiment
12 would show -- the not superexpress would show more
13 chapters because they have the second level of stuff
14 as well.

15 So in one situation it would have more
16 information that -- more information than the first
17 reproduction mode, but also include what is in the
18 first reproduction.

19 BY MR. ELLISON:

20 Q Okay. So let's go back to Exhibit 1001.

21 A That's the patent, right? Yeah. Okay.

22 Q Figure 9, which is on page 9 of

1 Exhibit 1001, has a list of the chapter IDs and the
2 chapter importance level.

3 You'll let me know when you're looking at
4 that?

5 A Yeah, I'm there.

6 Q Okay. So as you testified earlier, your
7 understanding is that the chapter IDs can just be
8 corresponding to a single image file, right?

9 A It is possible, yes, in the extreme case,
10 yes.

11 Q Now, the superexpress reproducing mode in
12 the patent would reproduce just Chapters 2 and 5,
13 right?

14 A I believe so, yes, because of the
15 importance level of one.

16 Q The express reproducing mode in the patent
17 would reproduce Chapters 2, 4, 5, and 9, right?

18 A I believe that is correct. I just have to
19 look if the express stops at Level 3. I think it
20 does. Yes.

21 Okay. I think that's correct.

22 Q So the express and the superexpress modes

1 would be embodiments of the first and second
2 reproducing modes in claim 11 in this situation,
3 right?

4 A It could be, yes.

5 Q How would these two modes meet limitation
6 11.c that we were looking at before?

7 MR. PLUTA: Object to form.

8 THE WITNESS: So the -- if the first mode
9 is the superexpress that only does the ones with the
10 Level 1 frames -- the Level 1 chapters, the express
11 does everything that the superexpress does, plus the
12 Level 3 chapters. So, therefore, it meets claim
13 11.c because it -- the one mode does Level 1 and 3;
14 the other mode only does Level 1.

15 BY MR. ELLISON:

16 Q So what would be the -- which of the two,
17 express or superexpress, would be the first
18 reproducing mode of claim 11?

19 MR. PLUTA: Object to form.

20 THE WITNESS: So you said, "superexpress."
21 That would be claim -- sorry. Not claim -- the
22 first reproduced.

1 BY MR. ELLISON:

2 Q Superexpress would be the first reproducing
3 mode as recited in claim 11, right?

4 A Because it's short, yes, and the second one
5 would be express because it's longer and it includes
6 the frames that -- or the content that is -- the
7 patent language used image information that was
8 reproduced under the first reproduction mode and
9 additional information that was not in the first
10 reproduction mode.

11 Q Well, how do you know that the express
12 reproducing mode is longer?

13 A Than the superexpress? Because it contains
14 more information and has to show more chapters, and
15 so it's a super set of showing what was shown in the
16 superexpress mode.

17 Q Do you want to take, maybe, a 10-minute
18 break?

19 A Sure.

20 Q We've been going for a little over an hour.

21 MR. PLUTA: Sure.

22 [Recessed at 10:05 a.m.)

1 [Reconvened at 10:21 a.m.)

2 BY MR. ELLISON:

3 Q Dr. Balakrishnan, can you go to page 38 of
4 your declaration, paragraph 72, please.

5 A Okay. I'm there.

6 Q And this is the start of the discussion in
7 your declaration regarding the proposed construction
8 for the term "mode"; is that right?

9 A That is correct.

10 Q Okay. And I think we looked at paragraph
11 77 before, but I want to direct your attention to
12 that. That's on page 40.

13 Are you there?

14 A Yes, I'm there now.

15 Q Now, you have here a couple dictionary
16 definitions of the word "filter."

17 A I do.

18 Q Can you explain how a filter works?

19 A I'll say a filter is some kind of code
20 that -- well, it's used as definition on the chart.
21 It uses patterns, masks, or some kind of criteria to
22 compare data and only data that matches that

1 criteria, but would pass through that filter.

2 Q So when you say a "kind of criteria," would
3 that be some sort of, like, a threshold?

4 A It depends on what the filter is, but it
5 could be -- maybe I'll ask you what threshold are
6 you talking about? Are you saying a threshold,
7 "Give me all the pictures above a certain size," and
8 the size is the threshold, then, yes, that could be
9 filtering based on size, for example.

10 Q What other examples of filters could you
11 give me?

12 A Well, I could filter based on -- based on
13 color. I can filter based on length of time of
14 something. It's a criteria, a mask. Depends on
15 what the criteria is that will allow data through or
16 not allow data through the filter.

17 Q Okay. So on the page 39 -- I think it's
18 paragraph 75. You'll let me know when you're there?

19 A I'm there. Sorry.

20 Q You mention here, in paragraph 75, that the
21 '848 patent explains selecting between the three
22 reproducing modes from a menu.

1 Do you see that?

2 A Yes. Yes.

3 Q What's the significance of selecting from a
4 menu?

5 A Well, I think it's just saying it's picking
6 one of these three different modes as separate
7 modes. I mean, I could just as easily pick it from
8 three different icons, but then the set of icons
9 becomes the menu. But the point is that these are
10 separate modes as described in the patent, and, you
11 know, they have different states, different
12 operational states. It has switched the system
13 into, in one case, standard, the other one express,
14 and the other one superexpress.

15 Q So the fact that you can select the
16 standard express and superexpress modes from a menu
17 is indicative of the fact that they're different
18 operational states?

19 A That is one indication, that it gives me
20 three different modes, but it's not the only way to
21 determine whether these are different modes or not.
22 Just because I select something from a menu doesn't

1 mean I go into a mode necessarily, but, in this
2 situation, it is explaining that I have different
3 modes and it uses the term "mode" as well, the
4 patent does.

5 Q Understood. I'm just trying to understand
6 the significance of you saying here that they're
7 selected from a menu.

8 A Okay. I think I've already answered that
9 question. I'm not sure I have much more to add to
10 that.

11 Q Now, you cite to three different passages
12 from Exhibit 1001 as support for this statement in
13 paragraph 75, right?

14 A That is correct.

15 Q Can you pull up Exhibit 1001?

16 A Yeah. I'm there.

17 Q Okay. I want you to go to column 9.

18 A I'm there.

19 Q The patent doesn't really say anything
20 about menu other than that it exists in my reading;
21 is that right to you?

22 A Well, it says you select from the menu. So

1 I'm not sure I totally understand the question. Are
2 you saying there is a picture of the menu? Is that
3 kind of what you're saying?

4 Q Yeah, I mean, what kind of menu are we
5 talking about here?

6 A Let's look. Maybe it's in the figures. I
7 don't think the patent, just from my quick skim
8 again here, gives a lot of detail of any particular
9 type of menu. It uses the term "menu," and I'm
10 reading it as one of skill in the art, using the
11 plain meaning of the word "menu" here.

12 Q Does it need to be a particular kind of
13 menu?

14 A I don't think so. Any menu that one of
15 skill in the art would consider a menu would be
16 fine. I don't think it's limited to a particular
17 type of menu.

18 Q Does the type of menu have any impact on
19 whether you would consider selecting from a menu to
20 be an indicator that you're choosing a mode?

21 MR. PLUTA: Object to form.

22 THE WITNESS: I think it would depend on

1 what operational state we're in. If I'm already
2 within a state where I'm adjusting some criteria,
3 then you may not use a menu to adjust the criteria,
4 but this is adjusting the mode that I'm in, the
5 state that I'm in. So I think it would depend on
6 the context.

7 BY MR. ELLISON:

8 Q Okay. Can you go back to Exhibit 2030,
9 which is your declaration?

10 A I'm back there.

11 Q Can you go to page 69, paragraph 152,
12 please?

13 A Okay. Yeah, I'm there.

14 Q And paragraph 152 is part of your opinion
15 as to why Haitani's filters are not modes; is that
16 right?

17 A That is part of it, yes.

18 Q All right. And in paragraph 152, you say
19 in that first sentence that: "Haitani does not
20 [sic] disclose any separate processing occurring in
21 the processing circuit 32 or microprocessor 26
22 relating to the different filtering operations."

1 Do you see that?

2 A Yes.

3 Q What do you mean by "separate processing"?

4 A In other words, a separate mode or separate
5 operational state. It's in the same operational
6 state, and then, within that, doing different
7 filtering. That's all.

8 And if you look further down, where I
9 further expand in that same paragraph, referring to
10 Dr. Bederson's transcript showing the device
11 operating in the review mode. In other words, it's
12 all within the same pictures and videos mode, and
13 the processing that's happening is all to do with
14 that pictures and videos mode.

15 Q Okay. So modes, in order to be different,
16 have to be running different algorithms?

17 A At a highest level, they would be, yes,
18 because it's a different operational state. It's
19 allowing me to do different things, but just because
20 I run a different algorithm doesn't necessarily make
21 me in a different mode.

22 Q Understood.

1 But different modes will have different
2 algorithms if they're running; is that right?

3 A Yes, they may have some commonalities, but
4 they would -- they would have different processing
5 or different algorithms running within that mode
6 from, "Let's go back to another mode." I mean,
7 there may be some common elements. This is true for
8 most of computing technology, things that percolate
9 in different parts of a piece of software or even
10 hardware. So I think I'll leave it at that.

11 Q Okay. And so I take it that your point in
12 paragraph 152 is that Haitani is just running one
13 algorithm and it's switching out the criteria that
14 it's using to return different results for the image
15 search; is that right?

16 A I think that's fair, yes, and I think I am
17 saying that you're using the term "algorithm"
18 loosely to mean the processor as a whole.

19 Q And so running a single algorithm where
20 you're just switching out the filtering criteria is
21 not -- each criteria that you're using as a filter
22 is not an indicator of a different mode; is that

1 what you're saying?

2 A I think that is my high-level opinion,
3 yeah, on this issue.

4 MR. ELLISON: Can we take maybe a 5-minute
5 break. I think need to go through my notes, but I
6 think I'm almost done.

7 [Recessed at 10:36 a.m.]

8 [Reconvened at 10:44 a.m.]

9 BY MR. ELLISON:

10 Q Dr. Balakrishnan, I have no further
11 questions at this time.

12 A Okay. Thank you.

13 MR. PLUTA: Can we just take a short break
14 to consider whether or not I have any?

15 MR. ELLISON: That's fine.

16 [Recessed at 10:44 a.m.]

17 [Reconvened at 10:53 a.m.]

18 MR. PLUTA: I don't have any questions.

19 THE COURT REPORTER: Are you purchasing a
20 copy of the transcript, Mr. Pluta?

21 MR. PLUTA: No, but I would like a rough
22 draft if you have one.

1 THE COURT REPORTER: If you purchase the
2 rough, then you also purchase the final.

3 MR. PLUTA: Yeah. Sure.

4 THE COURT REPORTER: Regular service is 10
5 business days for the final. The rough will go out
6 tonight.

7 All right. That's all I need. I have your
8 order, Mr. Ellison.

9 [Signature having not been discussed,
10 the deposition of Ravin Balakrishnan, Ph.D. was
11 concluded at 10:54 a.m. EDT.)
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IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 6th day of April 2025.

My commission expires:

May 31, 2025

Joan V. Cain

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Notice Date: Monday, 7. April 2025

Attention: Ravin Balakrishnan, Ph.D.

Re: Samsung Patent Appeals
Deposition of Ravin Balakrishnan, Ph.D. (4/3/2025)

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Deponent Errata Page

Notice Date: 04/07/2025

Deposition Date: 4/3/2025

Deponent: Ravin Balakrishnan, Ph.D.

Case Name: Samsung Patent Appeals

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I hereby certify that the individual representing himself/herself to be the above-named individual, appeared before me this ____ day of _____, 20__, and executed the above certificate in my presence.

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