Transcript of Dr. Agnieszka Roginska

Date: February 27, 2024
Case: Meta Platforms, Inc. -v- Eight kHz, LLC (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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META PLATFORMS, INC.,

Petitioner,

v.

EIGHT KHZ, LLC,

Patent Owner.

_____

Case IPR 2023-01019

Patent 10,368,179

Case IPR 2023-01020

Patent 10,448,184

Case IPR 2023-01024

Patent 11,290,836

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Videotaped Deposition of DR. AGNIESZKA ROGINSKA

Conducted virtually via Zoom

Tuesday, February 27, 2024 at 9:30 a.m. CST

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Job No.: 526237

Pages: 1 - 296

Reported by: THERESA A. VORKAPIC,

CSR, RMR, CRR, RPR

Videotaped deposition of Dr. Agnieszka Roginska, conducted virtually via Zoom, pursuant to notice before Theresa A. Vorkapic, a Certified Shorthand Reporter, Registered Merit Reporter, Certified Realtime Reporter, Registered Professional Reporter and a Notary Public in and for the State of Illinois.

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A P P E A R A N C E S (Continued)

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C O N T E N T S

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E X H I B I T S

(Attached to transcript.)

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P R O C E E D I N G S

THE VIDEOGRAPHER: Here begins video file No. 1 in the video deposition of Agnieszka Roginska Ph.D., in the matter of Meta Platforms, Inc. versus Eight KHz, LLC, the United States Patent and Trademark Office, before the Patent Trial and Appeals Board, Case No. IPR-2023-01019 and 01020 and 01024.

Today's date is February 27, 2024 and the time on my video monitor is 9:30 a.m. Eastern Time. My name is Robert Leonard. I'm the video specialist. I represent Planet Depos. This deposition is being taken via Zoom.

Will counsel please identify themselves verbally and state who they represent.

MR. HENRY: This is Chris Henry of Latham & Watkins for petitioners and the witness.

MS. PIANA: This is Jayne Piana at Fletcher Yoder for Eight KHz.

I was going to note we also have Jayme Partridge who looks to be connecting to audio. She is with Spencer Fane and represents Eight KHz.

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THE VIDEOGRAPHER: The court reporter today is Theresa Vorkapic. She also represents Planet Depos. Will the court reporter please swear in the witness.

THE REPORTER: Would you raise your right hand, please.

(The witness was duly sworn.)

DR. AGNIESZKA ROGINSKA,
called as a witness herein, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MS. PIANA:

Q Great. Thank you.

Dr. Roginska, will you please state your full name for the record this morning.

A Agnieszka Roginska.

Q Where are you sitting today?

A I'm sitting in the office of Latham & Watkins in New York City.

Q I see that Mr. Henry is there with you; is that correct?

A That's correct.

8

Q Is there anybody else with you in the room?

A No.

Q You understand that when we're on the record you're not supposed to be chatting with counsel for Meta with Mr. Henry via any chat feature; is that right?

A That's right.

Q What materials did you bring with you to your deposition today?

A I have a clean copy of my both my declarations and I have printed copies of all the exhibits and I have electronic copies of my declaration -- declarations and the patents.

Q You mentioned you have clean copies of your declarations, so I assume that means it no handwritten notes?

A That's correct.

Q Do you have any handwritten notes on any of the materials with you today?

A No.

Q Without revealing any attorney-client

9

1 privileged information, what did you do to prepare
2 for your deposition today?
3 A I reviewed my declarations as well as the
4 exhibits, and I met with the counsel for Meta.
5 Q Is that Mr. Henry?
6 A That's correct.
7 Q Did you meet with any other counsel for
8 Meta?
9 A I did.
10 Q Who was that?
11 A Inge Osman.
12 Q About how long did you meet with counsel?
13 A Do you mean to prepare for today?
14 Q Yes. Thank you.
15 A We met four times. Each time anywhere
16 between two hours and full day, I'm guessing
17 around eight hours.
18 Q So if you were to add up generally what
19 those time periods are, how many hours did you
20 spend meeting with counsel to prepare for your
21 deposition today?
22 A Let me do the math. Probably around 22,

10

1 24 hours.
2 Q Generally when did those meetings occur?
3 A They occurred last week and yesterday.
4 Q Dr. Roginska, what is the hourly rate that
5 you are charging for your time in this case?
6 A 550 per hour.
7 Q About when did you start working on these
8 IPRs?
9 A It was around September of 2022.
10 Q Back to your hourly rate, is that your
11 standard hourly rate for this type of work?
12 A Yes, it is.
13 Q How many times have you been deposed
14 before?
15 A This is my first time.
16 Q So just to go over some of the rules of
17 the road, and your counsel may have covered this
18 with you in your preparation, but this is
19 obviously a remote deposition. Our tech,
20 Mr. Plummer, is going to help with the exhibits.
21 If you have any questions or any technical issues
22 regarding the exhibits, please let us know and we

11

1 will do our best. We want to make sure that you
2 are answering the questions and looking at the
3 exhibits -- answering the questions fully and
4 seeing the exhibits that we'll be discussing
5 today.
6 As we proceed throughout the day, I will
7 be asking you questions. Your counsel may object,
8 but you still have to proceed and answer my
9 questions unless your counsel instructs you not
10 to.
11 Do you understand that?
12 A I do.
13 Q Also, as we proceed throughout the day,
14 you know that you can ask for a break.
15 A Yes.
16 Q Great. I will ask you that -- happy to
17 take a break whenever you need one, but if there
18 is a pending question, let's finish -- let's get
19 your answer to the pending question before we take
20 a break.
21 Is that okay with you?
22 A Yes.

12

1 Q Is there any reason you cannot provide
2 accurate and truthful testimony to my questions
3 today?
4 A No.
5 Q Dr. Roginska, do you know Dr. Durand
6 Begault?
7 A I do.
8 Q How do you know him?
9 A I met him early 2000s. I don't remember
10 exactly the date, and we with worked on a project
11 together when I was working for a company in
12 California. So we worked together for I guess it
13 must have been maybe a couple of years on one
14 specific project. Durand Begault was also on my
15 doctoral defense at Northwestern.
16 Q What is your general opinion of
17 Dr. Begault?
18 MR. HENRY: Objection. Form.
19 BY THE WITNESS:
20 A My general opinion is that Durand Begault
21 is person who has clearly been working in the area
22 of 3D sound for a long time and has published

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1 **several papers and as well as a book in the area**
2 **of spacial audio and is regarded as a notable**
3 **figure in the field.**
4 Q So would you agree that he's an expert in
5 this field?
6 **A I would agree, yes.**
7 Q You've relied on some of his work in this
8 case; is that correct?
9 **A That's correct.**
10 Q Which work in particular have you relied
11 on from Dr. Begault in this case?
12 **A In particular I've relied on the book,**
13 **titled 3D Sound that he wrote, first version was**
14 **in 1994 and the subsequent edition was in the year**
15 **2000.**
16 Q Do you have any reason to doubt him as an
17 expert in this field?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 **A I guess it would depend on what we're**
21 **specifically talking about.**
22 **BY MS. PIANA:**

14

1 Q Okay. We'll go through that today.
2 Have you reviewed Dr. Begault's
3 declarations in the '179, '184 IPRs or the '836
4 IPR?
5 **A I've seen them. I would say I skimmed**
6 **through them.**
7 Q Do you have any comments on either of
8 those declarations from declarations from
9 Dr. Begault?
10 MR. HENRY: Objection to form. Ambiguous.
11 BY THE WITNESS:
12 **A As I said, I skimmed the document. If**
13 **there's a specific question that you have, I'm**
14 **happy to answer.**
15 Q I think we'll get to that later today.
16 What about Dr. Kyla McMullen, do you know
17 her?
18 **A I do.**
19 Q How do you know Dr. McMullen?
20 **A Let me think. So I met Dr. McMullen when**
21 **she was a PhD student at I think it was Michigan,**
22 **University of Michigan, and we were working on a**

15

1 **project together and I was working on that project**
2 **with her then advisor so she was involved in some**
3 **of the work.**
4 Q I'm sorry, did you say that you were
5 Dr. McMullen's advisor?
6 **A No, no. I was working with Dr. McMullen's**
7 **advisor at University of Michigan and so I was**
8 **working with him, and since she was his advisee,**
9 **she was involved in that project.**
10 Q Thank you for the clarification there.
11 Would you agree that Dr. McMullen is an
12 expert in this field?
13 **A Yes.**
14 Q Are you aware that Dr. McMullen was
15 deposed in the litigation that is proceeding in
16 parallel to these IPRs?
17 **A I don't think so. I don't believe I**
18 **was -- I knew that.**
19 Q Do you have any reason to doubt
20 Dr. McMullen's status as an expert in this
21 field?
22 **A No. She has been working in this field**

16

1 **for now many years and she's a professor, so in my**
2 **opinion she should be considered an expert.**
3 Q So I take it you have not reviewed
4 Dr. McMullen's deposition transcript from the
5 litigation?
6 **A No.**
7 Q How would you define a person of ordinary
8 skill in the art in these cases?
9 MR. HENRY: Objection to form.
10 BY THE WITNESS:
11 **A So I covered this in my declaration.**
12 **BY MS. PIANA:**
13 Q Why don't we go ahead and introduce your
14 declaration as Exhibit 1.
15 MS. PIANA: Mr. Plummer, if you could pull
16 up the document entitled: Roginska '179, '184
17 declaration.
18 AV TECH PLUMMER: Stand by. One moment.
19 Bear with me. This first one will be a little bit
20 slower, but it will be smoother going forward.
21 I've uploaded it to the file in the chat
22 and I'm showing it on the screen now.

17

1 BY MS. PIANA:
2 Q Dr. Roginska, can you see what's been
3 marked as Exhibit 1 on the screen?
4 **A Yes, I can.**
5 (A certain document was marked Roginska
6 Deposition Exhibit 1 for identification,
7 as of 02/27/2024.)
8 BY MS. PIANA:
9 Q Can you identify that document for us,
10 please?
11 **A That document is my declaration for**
12 **patents '179 and '184.**
13 Q It sounds like you are very familiar with
14 the way we routinely refer to patents by their
15 last three digits.
16 **A That's correct.**
17 Q So if when I talked about the '179 patent
18 or the '184 patent, you know exactly which patents
19 I'm discussing, right?
20 **A That's correct.**
21 Q I would ask you a question about your
22 definition of a person of ordinary skill and you

18

1 mentioned your declaration, which is why we've
2 introduced it now as Exhibit 1.
3 I'll repeat my question about how would
4 you define a person of ordinary skill in the art
5 in this field? If you would like to refer to a
6 particular paragraph in your declaration, feel
7 free to do so.
8 **A Sure, thank you.**
9 **So, yes, I would like to refer in my**
10 **declaration to paragraph number 34. And in that**
11 **paragraph, I describe the level of skill in the**
12 **art: "A POSA at the time of the priority date for**
13 **the '179 and '184 patents either December 27, 2015**
14 **or their filing dates, May 2, 2019 and June 16,**
15 **2019, would have had a bachelor's degree in**
16 **computer science or engineering, music technology,**
17 **and at least two years of industry experience or**
18 **academic research experience in virtual or**
19 **augmented reality, audio engineering, or an**
20 **equivalent. Additional education can compensate**
21 **for less experience and vice versa".**
22 Q Thank you. Can you explain what you mean

19

1 by that last sentence: "Additional education can
2 compensate for less experience and vice versa"?
3 **A Sure. What I mean is that a person who**
4 **might have more education than the stated**
5 **education above, which is a bachelor's degree, so**
6 **a person with more education can compensate for**
7 **having less experience in the industry, which I**
8 **state here as being two years or vice versa,**
9 **meaning that if a person has more experience in**
10 **the industry, they might have less education than**
11 **I stated.**
12 Q Do you think a POSA --
13 Do you think a person who had zero years
14 of industry experience would meet your definition
15 of a POSA as stated here in Paragraph 34?
16 **A They might.**
17 Q Could you expand on that?
18 **A Sure.**
19 MR. HENRY: Objection to form.
20 BY THE WITNESS:
21 **A A person who has advanced degrees and has**
22 **done significant work during their advanced**

20

1 **degrees, for example, Masters or a Ph.D. degree,**
2 **might have a significant level of experience,**
3 **sometimes even more experience than a person who**
4 **would be working in the industry.**
5 **BY MS. PIANA:**
6 Q Is the experience that you were just
7 mentioning that a person would get in getting
8 their Masters or Ph.D., is that industry
9 experience?
10 **A Well, if they are not employed in the**
11 **industry, it wouldn't be technically industry**
12 **experience, however, there are cases, for example,**
13 **when I work with Ph.D. students who have**
14 **internships in the industry and gain some**
15 **experience through that.**
16 **The people or students who are working on**
17 **advanced degrees very often work on projects that**
18 **might be similar to projects you would expect to**
19 **see in the industry.**
20 Q Did -- this concept of additional
21 education compensate for less experience and vice
22 versa, did that come from you?

21

1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 **A Yes.**
4 **BY MS. PIANA:**
5 Q It did not come from your counsel?
6 MR. HENRY: Objection to form.
7 BY THE WITNESS:
8 **A No, it did not.**
9 **BY MS. PIANA:**
10 Q So back to the way you defined a POSA here
11 in Paragraph 34, you would agree that Dr. Begault
12 has these credentials and would meet this
13 definition?
14 **A No, I would -- I think Dr. Begault, given**
15 **his extensive experience, has more than the person**
16 **of ordinary skill in the art.**
17 Q So in your opinion, Dr. Begault would have
18 a higher level of expertise than a person of
19 ordinary skill in the art?
20 **A Yes.**
21 Q What about yourself?
22 **A The same. I would say I have more than --**

22

1 **more skill than the person of ordinary skill in**
2 **the art.**
3 Q This first part of Paragraph 34, you
4 mention a few dates. You say December 27, 2015 or
5 their filing dates, May 2nd, 2019 and June 16,
6 2019.
7 Why did you mention those dates in this
8 paragraph?
9 **A Well, those dates -- so December 27, 2015**
10 **if I am looking at '179 patent December 27, 2015**
11 **is the earliest filing date that is listed on the**
12 **patent. And the date of May 2nd, 2019 is listed**
13 **as the date that the patent was filed and the date**
14 **June 16, 2019 is listed on the '184 patent as the**
15 **date that the patent was filed.**
16 Q So why did you -- thank you for taking me
17 through those dates.
18 So why did you mention those in your
19 definition of a person of ordinary skill in the
20 art?
21 MR. HENRY: Objection to form, asked and
22 answered.

23

1 BY THE WITNESS:
2 **A As I said, I mentioned those dates**
3 **because -- it's it is at that time that I think**
4 **that the patents were filed. So when I was**
5 **thinking about the person of ordinary skill in the**
6 **art, I was going back to what that person would**
7 **have been at that time.**
8 **BY MS. PIANA:**
9 Q But your definition of a person of skill
10 in the art doesn't change depending -- based on
11 the date, does it?
12 **A It might.**
13 Q How would it change?
14 **A Well, it might change because in my field**
15 **especially technology advances very quickly and so**
16 **I wanted to specifically state that when I was**
17 **looking at these patents and reviewing the**
18 **documents for this case, I had in mind**
19 **specifically that what a person of skill in the**
20 **art at that time would have known and should have**
21 **known in relationship to these patents.**
22 Q Are your opinions as stated in this

24

1 declaration here Exhibit 1, are they any different
2 depending on which date you are using for a person
3 of ordinary skill in the art?
4 MR. HENRY: Objection to form.
5 BY THE WITNESS:
6 **A Well, I wrote these opinions and that I**
7 **stand by them and, as I said, when I was reviewing**
8 **these documents, I had in mind what a person of**
9 **skill in the art would have been like and should**
10 **have been like during -- at those dates.**
11 **BY MS. PIANA:**
12 Q So do you have a different opinion about
13 what a person of ordinary skill in the art would
14 have known at the date of December 27, 2015
15 versus, for example, May 2nd, 2019?
16 MR. HENRY: Objection to form, ambiguous.
17 BY THE WITNESS:
18 **A I'm not sure what you mean.**
19 **BY MS. PIANA:**
20 Q Sure. In this declaration, you have
21 listed many opinions about the '179 and the '184
22 patents, correct?

25

1 **A Correct.**
2 Q Are those opinions based on what a POSA, a
3 person of ordinary skill in the art, would have
4 known as of December 27, 2015?
5 **A As I said here, either December 27, 2015**
6 **or the filing dates of May 2nd, 2019 and June 16,**
7 **2019.**
8 Q You just said, though, that a POSA may
9 know something different as of December 27, 2015
10 or May 2nd, 2019, correct?
11 MR. HENRY: Objection to form.
12 BY THE WITNESS:
13 **A Well, you know, in my field there are**
14 **papers that come out all the time. There's**
15 **knowledge that is being added. So every year a**
16 **POSA would have more knowledge, more information**
17 **depending on the research that comes out.**
18 **BY MS. PIANA:**
19 Q Okay. And so your opinions as listed in
20 your declaration here in Exhibit 1, are they based
21 on a POSA as of December 27, 2015 or a POSA as of
22 May 2nd, 2019 or a POSA as of June 16, 2019?

26

1 MR. HENRY: Objection to form, asked and
2 answered, ambiguous, including with respect to
3 what opinions we're talking about.
4 BY THE WITNESS:
5 **A Well, regardless of the dates that the**
6 **person would have had, again, a bachelor's degree**
7 **and the equivalent of at least two years of**
8 **industry experience or academic research**
9 **experience.**
10 **BY MS. PIANA:**
11 Q So we'll look at some of your specific
12 paragraphs in your declaration, and maybe we'll
13 look and see if you've signified whether your
14 opinion is based on a POSA as of December 27, 2015
15 or a POSA as of May 2nd, 2019, and if you haven't,
16 then I will ask you those questions.
17 MR. HENRY: Objection to form. Is there a
18 question there or just a narrative?
19 MS. PIANA: That's a great question,
20 Counsel. It was just a clarifying narrative.
21 BY MS. PIANA:
22 Q But here's a question.

27

1 How would I know reading your declaration
2 which version of a POSA you are applying for your
3 opinions?
4 MR. HENRY: Objection to form, calls for
5 speculation.
6 BY THE WITNESS:
7 **A The POSA that I describe, again, has a**
8 **bachelor's degree or the equivalent of a**
9 **bachelor's degree in computer science and at least**
10 **two years of industry experience.**
11 **BY MS. PIANA:**
12 Q I understand. And you testified that a
13 POSA may know -- may have a different amount of
14 knowledge as of December 27, 2015 than a POSA as
15 of May 2nd, 2019, correct?
16 MR. HENRY: Objection to form.
17 BY THE WITNESS:
18 **A I mean, with regards to these patents in**
19 **this case, the knowledge, the basic knowledge of a**
20 **person who has a bachelor's degree in computer**
21 **science and has two years of experience would be**
22 **virtually the same between those dates.**

28

1 **BY MS. PIANA:**
2 Q So is it your testimony that in these
3 cases with this technology, the date for the POSA
4 does not matter?
5 MR. HENRY: Objection to form,
6 mischaracterizes the witness's testimony.
7 BY THE WITNESS:
8 **A No, I didn't say that. I said that -- I**
9 **didn't say that.**
10 **BY MS. PIANA:**
11 Q Okay. I'm trying to understand what you
12 did say.
13 **A What I said was that a person who has a**
14 **bachelor's degree in computer science or**
15 **engineering and has two years of experience would**
16 **have had at those dates virtually the same**
17 **understanding of the field and the knowledge.**
18 Q So a POSA's knowledge as of -- I'll just
19 use a year for shorthand.
20 A POSA's knowledge as of 2015 would be
21 about the same as a POSA's knowledge as of 2019;
22 is that what you're saying?

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1 MR. HENRY: Objection to form,
2 mischaracterizes testimony.
3 BY THE WITNESS:
4 **A No. That's not what I said.**
5 **What I said was that the POSA would have**
6 **had the same background, the same bachelor's and**
7 **industry background or the equivalent thereof.**
8 **BY MS. PIANA:**
9 Q So what a POSA would know as of 2015
10 knowledge would be the same as what a POSA would
11 know as of 2019?
12 MR. HENRY: Objection to form, asked and
13 answered, mischaracterizes testimony.
14 BY THE WITNESS:
15 **A So, again, the fact that the person is a**
16 **person of ordinary skill in the art, right, I want**
17 **to underline the ordinary skill in the art, but**
18 **has a bachelor's degree and two years of**
19 **experience would have given them that fundamental**
20 **knowledge that would have been essentially the**
21 **same.**
22 **BY MS. PIANA:**

30

1 Q Were there technological advances in this
2 industry between December 2015, and May 2nd, 2019?
3 MR. HENRY: Objection to form, calls for
4 speculation, ambiguous.
5 BY THE WITNESS:
6 **A I mean, technology moves forward all the**
7 **time and so I can say that generally speaking sure**
8 **there probably were advances.**
9 **BY MS. PIANA:**
10 Q I think you testified previously that
11 technology in this area moves very quickly; is
12 that correct?
13 MR. HENRY: Objection to form.
14 BY THE WITNESS:
15 **A Yeah, it could, yeah, in some instances.**
16 **BY MS. PIANA:**
17 Q So would a POSA in 2015 have the
18 benefit -- strike that.
19 Would a POSA in 2019 have the benefit of
20 understanding those technological advances that
21 occurred from 2015 to 2019?
22 MR. HENRY: Objection to form, lacks

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1 foundation.
2 BY THE WITNESS:
3 **A They could. You know, I often say some**
4 **things change, some things stay the same.**
5 **BY MS. PIANA:**
6 Q So in your opinions in this declaration,
7 are you applying a different POSA in 2019 versus a
8 POSA in 2015?
9 MR. HENRY: Objection to form, asked and
10 answered.
11 BY THE WITNESS:
12 **A So as I said before, the definition that I**
13 **am applying is a person who has a bachelor's**
14 **degree, and -- a bachelor's degree in computer**
15 **science, engineering or affiliated fields and at**
16 **least two years of industry experience.**
17 **BY MS. PIANA:**
18 Q Right. Would a person who has a
19 bachelor's degree in computer science and
20 engineering and music technology in 2019 have the
21 benefit of technological advances in the field
22 from 2015?

32

1 MR. HENRY: Objection to form, asked and
2 answered, lacks foundation.
3 BY THE WITNESS:
4 **A They might. They might, but not**
5 **necessarily.**
6 **BY MS. PIANA:**
7 Q But would you agree that somebody who has
8 a bachelor's degree in computer science,
9 engineering, music technology, part of getting a
10 bachelor's degree is understanding what the
11 technology is at that date.
12 Would you agree with that?
13 MR. HENRY: Objection to form.
14 BY THE WITNESS:
15 **A No. It depends on the university you go**
16 **to, it depends on the specific program you're in,**
17 **it depends on many factors.**
18 **BY MS. PIANA:**
19 Q So would a POSA in 2019 be different than
20 a POSA in 2015?
21 MR. HENRY: Objection to form, asked and
22 answered.

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1 BY THE WITNESS:
2 **A No, they wouldn't be. So I am considering**
3 **the same person to be a POSA -- a person who had**
4 **the same educational background and the same**
5 **industry experience.**
6 **BY MS. PIANA:**
7 Q But those POSAs may be different, correct?
8 MR. HENRY: Objection to form, asked and
9 answered.
10 BY THE WITNESS:
11 **A They wouldn't be different. Again, they**
12 **would have the same education background and they**
13 **would have the same equivalent of industry**
14 **experience.**
15 **BY MS. PIANA:**
16 Q Would a POSA in 2019 have additional
17 information about technology than a POSA in 2015?
18 **A Maybe. I guess it depends.**
19 Q As part of your education and your
20 experience, did you have additional knowledge in
21 2019 versus what you knew in 2015 about this
22 field?

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1 **A Well, my job is to read papers, go to**
2 **conferences and read very advanced articles in my**
3 **field, so I -- that's my job is to learn and to**
4 **become more of an expert.**
5 Q So would you say that you did have
6 additional knowledge about this field in 2019 than
7 you did in 2015?
8 **A And when you say "this field", what**
9 **specific field do you mean?**
10 Q What field do you consider yourself to be
11 an expert in? How would you describe that field?
12 MR. HENRY: Objection to form, compound.
13 BY THE WITNESS:
14 **A So I think there were two questions there.**
15 **If we could break them down.**
16 **BY MS. PIANA:**
17 Q Sure. How would you describe the field
18 that you are an expert in?
19 **A I would describe that field to be spacial**
20 **and immersive audio.**
21 Q Okay. So would you say that you have
22 additional knowledge in the field of spacial and

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1 immersive audio in 2019 than you did in 2015?
2 **A I did because I read articles and go to**
3 **conferences to continue developing my expertise in**
4 **the field.**
5 Q And so would a POSA have had additional
6 knowledge in the field of spacial and immersive
7 audio in 2019 versus 2015?
8 **A Again, as I said. It depends. So a POSA**
9 **is a person of ordinary skill, and a person of**
10 **ordinary skill may or may not have had additional**
11 **training or knowledge between 2015 and 2019.**
12 Q So which version of a POSA have you used
13 in making your opinions in this declaration?
14 MR. HENRY: Objection to form, asked and
15 answered, ambiguous including with respect to what
16 opinions we're talking about.
17 BY THE WITNESS:
18 **A So, again, the definition of POSA that I**
19 **am using is a person who has a bachelor's degree**
20 **with two years of industry experience.**
21 **BY MS. PIANA:**
22 Q Right. And is that person in December 27,

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1 2015 or is that person in 2019?
2 MR. HENRY: Objection to form, asked and
3 answered.
4 BY THE WITNESS:
5 **A So the person of both those dates would**
6 **have had -- because they are a person of ordinary**
7 **skill they would've had virtually the same type of**
8 **background.**
9 **BY MS. PIANA:**
10 Q So are you saying that a person of
11 ordinary skill in 2019 would not have had any
12 additional knowledge compared to a person of
13 ordinary skill in 2015?
14 MR. HENRY: Objection to form, asked and
15 answered, mischaracterizes testimony.
16 BY THE WITNESS:
17 **A That's not what I'm saying. What I'm**
18 **saying is that they may or may not have, but since**
19 **they are a person of ordinary skill with that**
20 **level of education, with a bachelor's degree and**
21 **two years of industry experience, their knowledge**
22 **base would be pretty similar.**

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1 **BY MS. PIANA:**
2 Q So their knowledge base would be pretty
3 similar even though you said that this area of
4 technology advances rapidly?
5 MR. HENRY: Objection. Form,
6 mischaracterizes testimony.
7 BY THE WITNESS:
8 **A As I said before, the -- sure, technology**
9 **evolves and as I said some things evolve and some**
10 **things stay the same. So if you want to ask me a**
11 **specific question about a particular part of the**
12 **technology that may or may not have evolved, I can**
13 **answer that question probably better.**
14 **BY MS. PIANA:**
15 Q So you said earlier that a person of
16 ordinary skill in 2019 may or may not have
17 additional technical information versus a person
18 in 2015; is that correct?
19 **A They may or may not depending on what**
20 **specific technology we're talking about.**
21 Q We're talking about the area of technology
22 that you are an expert in.

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1 MR. HENRY: Objection to form.
2 BY MS. PIANA:
3 Q Correct?
4 **A Yeah, but that's a huge field.**
5 Q So when I am reading your opinions in your
6 declaration, how will I know or which version of a
7 person of ordinary skill you are using in
8 providing your opinions?
9 MR. HENRY: Objection to form, calls for
10 speculation.
11 BY THE WITNESS:
12 **A So as I said, that person of ordinary**
13 **skill has the undergraduate degree, bachelor's**
14 **degree in computer science or engineering, music**
15 **technology and two years of industry experience.**
16 **BY MS. PIANA:**
17 Q Right. And you said that a person of
18 ordinary skill in 2019 might have more technical
19 experience or more technical knowledge than a
20 person of ordinary skill in 2015, and I'm trying
21 to determine how I know which standard you are
22 applying in your opinions?

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1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 **A I'm applying the same standard for a**
4 **person of ordinary skill in the art.**
5 **BY MS. PIANA:**
6 Q Regardless of whether that person is in
7 2015 or in 2019?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 **A Again, they are -- since they are a person**
11 **of ordinary skill, and not have the expertise,**
12 **let's say, that a person like me would have, they**
13 **would have had basically the same knowledge, the**
14 **same ordinary -- person of ordinary skill**
15 **knowledge.**
16 **BY MS. PIANA:**
17 Q But could that level of ordinary skill
18 knowledge be different in 2019 versus 2015
19 especially in this fast-moving field?
20 MR. HENRY: Objection to form, asked and
21 answered, mischaracterizes testimony.
22 BY THE WITNESS:

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1 **A Can you repeat your question?**
2 **BY MS. PIANA:**
3 Q Sure. Your testimony is that a person of
4 ordinary skill unlike a person like you who has a
5 higher level of skill would have had basically the
6 same knowledge in 2015 or 2019; is that correct?
7 MR. HENRY: Objection to form.
8 BY THE WITNESS:
9 **A What I'm saying is a person of ordinary**
10 **skill would have that same education and same**
11 **industry experience, same amount of industry**
12 **experience.**
13 **BY MS. PIANA:**
14 Q Would you expect that same education to be
15 different in 2019 versus 2015?
16 MR. HENRY: Objection to form.
17 BY THE WITNESS:
18 **A That depends. That depends on the**
19 **university. It depends on the program. If you**
20 **want to give me a specific university, their**
21 **curriculum at those two dates, I can maybe look at**
22 **that, but it depends on many factors.**

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1 **BY MS. PIANA:**
2 Q Is it your testimony that a university
3 would not update their curriculum in a fast-moving
4 field from 2015 to 2019?
5 MR. HENRY: Objection to form, calls for
6 speculation argumentative, ambiguous.
7 BY THE WITNESS:
8 **A I don't know. Universities they work in**
9 **the way they work. So I can't speculate to what**
10 **each university does in terms of their curriculum.**
11 **BY MS. PIANA:**
12 Q Are you saying that a person -- are you
13 saying that the level of knowledge a person of
14 ordinary skill would have depends on the
15 university they went to?
16 MR. HENRY: Objection to form.
17 BY THE WITNESS:
18 **A Even though every university has their own**
19 **curriculum, there are -- the programs themselves**
20 **that I state here meaning computer science,**
21 **engineering and music technology, I would expect a**
22 **certain level of knowledge and background and**

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1 **information that every student would have during a**
2 **bachelor's degree.**
3 **BY MS. PIANA:**
4 Q Would you expect that that information
5 that is provided in the curriculum be updated
6 between 2015 and 2019 especially in a fast-moving
7 field like in this one?
8 MR. HENRY: Objection to form, calls for
9 speculation, mischaracterizes testimony.
10 BY THE WITNESS:
11 **A I don't know what each university does and**
12 **for undergraduate degrees, for bachelor's degrees.**
13 **Typically there is more consistency especially**
14 **when we're talking about specific programs, such**
15 **as in this case computer science, engineering,**
16 **music technology, the knowledge is -- you know,**
17 **can stay consistent, but I can't speculate whether**
18 **or not universities update their classes or**
19 **curriculum.**
20 **BY MS. PIANA:**
21 Q Do you know what level of knowledge a POSA
22 would have at December 2015 based on -- would it

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1 depend on the university and the curriculum?
2 MR. HENRY: Objection to form, compound.
3 BY THE WITNESS:
4 **A So if I answer your first question, would**
5 **I know what level of knowledge a POSA would have,**
6 **yes, I would. I expect a POSA with an**
7 **undergraduate degree in computer science,**
8 **engineering and music technology to have certain**
9 **fundamental knowledge which probably wouldn't be**
10 **very different between 2015 and 2019.**
11 **BY MS. PIANA:**
12 Q So you're saying there would be no
13 difference in the knowledge that a POSA would have
14 as of 2015 versus 2019?
15 MR. HENRY: Objection to form,
16 mischaracterizes testimony.
17 BY THE WITNESS:
18 **A That's not what I said. What I said that**
19 **a bachelor's degree would be -- a bachelor's**
20 **degree in computer science and engineering and**
21 **music technology would probably have fairly**
22 **consistent knowledge, but you also have to**

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1 **understand that it's not just the courses that are**
2 **being taught. It's everything around that a POSA**
3 **would be exposed to and, again, the two years of**
4 **industry experience at a level of experience that**
5 **I am considering in my definition of POSA.**
6 **BY MS. PIANA:**
7 Q And in terms of the two years of industry
8 experience, would you expect that industry
9 experience in 2019 would look different than
10 industry experience in 2015?
11 MR. HENRY: Objection to form. Sorry, go
12 ahead, Counsel. I thought you were done.
13 BY MS. PIANA:
14 Q Sorry. In this field?
15 MR. HENRY: Objection to form, ambiguous,
16 calls for speculation.
17 BY THE WITNESS:
18 **A So because there was an interruption, can**
19 **you repeat the question?**
20 **BY MS. PIANA:**
21 Q Sure. In terms of the two years of
22 industry experience that you've included in your

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1 definition of POSA, would you expect that industry
2 experience to look different in 2019 versus 2015?
3 MR. HENRY: Same objections.
4 BY THE WITNESS:
5 A I would expect there to be two years of
6 industry experience. That industry experience --
7 the amount of industry experience wouldn't
8 be different. It would be about two years of
9 experience, so it wouldn't be that different.
10 BY MS. PIANA:
11 Q I understand that the amount of industry
12 experience is the same, but would that industry
13 experience look different in 2019 versus 2015?
14 MR. HENRY: Same objections.
15 BY THE WITNESS:
16 A I mean, it could depending on what a
17 person, a specific person is working on but when
18 I'm thinking of a POSA, I'm thinking of a person
19 who has those two years of industry experience in
20 that field.
21 BY MS. PIANA:
22 Q Why don't we move on. Let's talk about

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1 different types of sound.
2 Can you describe in your own words what
3 mono sound is?
4 A So a mono sound or a monophonic sound is a
5 sound that has one channel of a audio information.
6 Q What does that mean?
7 A That means that there's one channel of
8 sound.
9 Q How would a user experience mono sound?
10 MR. HENRY: Objection to form.
11 BY THE WITNESS:
12 A A user might experience mono sound in many
13 different ways -- let me say, first of all, what
14 do you mean by experience?
15 BY MS. PIANA:
16 Q So if I'm a user and I've got my headset
17 on and what I'm hearing is mono sound, what does
18 it sound like to me as a user?
19 MR. HENRY: Objection to form.
20 BY THE WITNESS:
21 A So if in that specific situation you're a
22 user and you have headphones on and you're

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1 listening to mono sound, typically the mono sound
2 which is one channel of information would be
3 played to you to your left and your right ear.
4 BY MS. PIANA:
5 Q So would the sound I'm hearing in my left
6 ear if I'm hearing mono sound be different than
7 the sound I'm hearing in my right ear?
8 A If you're listening to mono sound, the
9 sound going to both the left and the right ear
10 would be the same.
11 Q So there would not be a difference in what
12 the user is hearing in the left ear versus the
13 right ear, correct?
14 MR. HENRY: Objection to form.
15 BY THE WITNESS:
16 A Well, the mono sound itself, the audio
17 signal going into the left and the right cups
18 would be the same. What the user experiences
19 might be different because of other factors.
20 BY MS. PIANA:
21 Q What other factors are you referring to?
22 A There could be like if your user -- if

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1 your headphones are not calibrated, there could be
2 other, you know, perceptual factors why the user
3 is not hearing the same sound.
4 Q But the signal that's going to the left
5 ear and the right ear is the same if it's mono
6 sound; is that correct?
7 A So, yes, there is just one channel of
8 audio and that same channel of audio is presented
9 to the left ear and to the right ear.
10 Q What do you mean by a channel? Could you
11 describe that in more detail?
12 A Sure. A channel is a signal, one signal.
13 Q What about stereo sound? How does stereo
14 sound differ from what you're described as mono
15 sound?
16 A So in contrast to mono sound which has one
17 channel, one signal of information, stereo has two
18 channels of information.
19 Q How does that change the user experience?
20 MR. HENRY: Objection to form, ambiguous.
21 BY THE WITNESS:
22 A Well, stereo sound might change the user

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experience in terms of -- because so stereo sound allows you to add a difference in, you know, something typically it's a level difference between those two channels of information. It might change how the user experiences -- hears the sound because a different channel is presented to the left ear and a different channel is presented to the right ear.

BY MS. PIANA:

Q Do you have a layperson's example that would compare a user's experience of stereo versus mono?

MR. HENRY: Objection to form.

BY THE WITNESS:

A In terms of comparing of the user's experience, what do you mean by that?

BY MS. PIANA:

Q So if you were explaining to my 78-year old grandmother the difference between mono and stereo sound, how would you explain that to her?

MR. HENRY: Objection to form, calls for speculation.

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BY THE WITNESS:

A Well, to your 78-year-old grandmother, I would explain that mono sound, again, will present one channel of information, and to your grandmother specifically, I would explain, okay, we're going to have one speaker, forget about headphones, we're not even going to go there, one speaker and there's going to be sound played over that one speaker.

Stereo we will have two speakers and there will be a signal going to the left speaker and a signal going to the right speaker.

BY MS. PIANA:

Q How would she be able to tell the difference between mono sound and stereo sound?

MR. HENRY: Objection to form, calls for speculation.

BY THE WITNESS:

A I don't know how your grandmother would perceive the difference to tell the truth.

BY MS. PIANA:

Q How do you perceive the difference,

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Dr. Roginska, between mono sound and stereo sound?

A Well, you were asking about the definition of mono sound and stereo sound, so the definition of mono sound is one channel of audio whereas the definition of stereo sound is two channels of audio.

Q I'm trying to understand what does that mean to somebody who is listening to mono versus stereo?

A What that means to a person would be that mono sound if we go back to our example listening over headphones, and it's exactly the same signal going to the left and the right headphone, and the ears are receiving exactly the same signal barring any kind of hearing disorders, that means that in monophonic sound would be positioned inside my head in the center of my head.

Q What about stereo sound?

A Stereo sound because now we have two channels of audio information that may vary in level, that means that I may be able to move the stereo sound between my left ear and the right

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ear, but because it's stereo and the only thing that we're adjusting is level, that sound would still appear to be coming from somewhere between the left and the right ear.

Q What do you mean by making an adjustment in level?

A That's fundamentally how stereo sound works. You can adjust the level between the signal going to the left channel and the signal going to the right channel to create what's called a phantom image somewhere between if we have -- whether it's speakers or headphones somewhere between the speakers or the headphones.

Q When you say you can adjust the level between the signal going to the left channel, is that adjusting the strength of the signal?

A Yeah. Changing the volume, the level.

Q So when you say that stereo sound has two channels of information and those two channels may vary in level, are you saying they may vary in volume?

A I guess you could say that, yeah. Sure.

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1 Q Would there be anything else that would be
2 different besides the volume?
3 MR. HENRY: Objection to form.
4 BY THE WITNESS:
5 A In stereo the only thing that you adjust
6 is the level between the two channels.
7 BY MS. PIANA:
8 Q So okay and when you adjust the level
9 between the two channels in stereo, the only thing
10 that you're adjusting is the volume?
11 MR. HENRY: Objection to form, asked and
12 answered.
13 BY THE WITNESS:
14 A What you're adjusting is the level between
15 the left and the right channel.
16 BY MS. PIANA:
17 Q Is that level that you're adjusting
18 between the left and the right channel the volume?
19 A I didn't call it the volume. When we say
20 volume, we typically mean the overall volume. I
21 would say we're adjusting the level or maybe the
22 intensity between the left and the right channels.

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1 Q So you mentioned that -- strike that.
2 If volume does not had mean overall volume
3 and it means the individual volume of the left
4 versus the right channel -- sorry, the left versus
5 the right signal, would you agree with the
6 statement that what is being adjusted in stereo is
7 the volume of the left signal versus the volume of
8 the right signal?
9 MR. HENRY: Objection to form.
10 BY THE WITNESS:
11 A I really wouldn't use the word volume. I
12 mean, volume typically refers to -- the volume
13 knob, so you're adjusting the volume of the entire
14 signal. When we're adjusting stereo signal, we're
15 really adjusting the level of the signal of the
16 left and the right channel.
17 BY MS. PIANA:
18 Q So what does a difference in level mean?
19 A It's a difference in intensity of the
20 signal.
21 Q What do you mean by intensity?
22 A I hate to use the word level, but it's an

55

1 adjustment of the level of the particular channel
2 signal.
3 Q So you said that level means intensity and
4 intensity means level. I'm still trying to
5 understand what you mean by level or intensity.
6 A How loud it is.
7 Q So adjusting the level between the signal
8 going to the left ear and the signal going to the
9 right ear means adjusting how loud the signal is
10 that's going to the left ear versus the signal
11 that's going to the right ear?
12 A It is adjusting the amplitude or the
13 intensity of that signal. I want to make one
14 clarification, how loud something is is more of a
15 perceptual factor and when we're talking about
16 stereo we're talking about an adjustment of the
17 actual signal?
18 Q Can you explain that to me?
19 A Sure. So when we're talking about
20 changing the intensity in the stereo signal
21 between the left and the right channels, we are
22 changing the level or the intensity or the

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1 amplitude is another way of thinking about it of
2 the actual signal. We are not going into how loud
3 it is and because loud is more of a perceptual,
4 it's a way to how you perceive a signal, the
5 signal strength.
6 Q So with stereo, the amplitude of the
7 signal going to the left ear can be adjusted
8 relative to the amplitude of the signal going to
9 the right ear, correct?
10 A Yeah, the signal of the left and the
11 right -- yeah, the left and the right signal can
12 be adjusted in amplitude.
13 Q So are you saying level means amplitude
14 here?
15 A I would say virtually they are probably
16 very, very similar. There are some minor
17 differences what amplitude and level is commonly
18 recognized to be virtually the same thing.
19 Q What about binaural sound, how would you
20 describe binaural sound?
21 A Binaural sound is a sound that has two
22 channels of information a left and a right but in

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a binaural sound you have three important cues that are present, the ITD, the ILD and spectral coloration.

Q Let's take those one by one. What is the ITD?

A The ITD is the interaural time difference.

Q What does that mean?

A That means that interaural, between the two ears. It's the time difference of arrival between the two ears.

Q Is the time difference of what arrival between the two ears?

A Of the arrival of the sound.

Q Would you agree it's the time difference of the arrival of the sound between the two ears?

A Yes.

Q So with binaural sound in the ITD, the left ear may receive the sound at different time than the right ear?

MR. HENRY: Objection to form.

BY THE WITNESS:

A With the ITD, but within the scope of the

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distance of the two ears, so the ITD, yes, it's a difference. It's an interaural time difference, and the left ear and the right ear might receive it at a different time, but it is confined between the distance of the two ears.

BY MS. PIANA:

Q What is an example where the left ear would receive the sound at a different time than the right ear?

A An example would be if you have a sound that is coming, for example, from directly to your right in that case the right ear receives the sound earlier than the left ear.

Q What about ILD, what is that?

A The ILD is the interaural level difference.

Q There's that word again, level. What does that mean?

A So it's the difference of level between the left and the right ear. So it's the difference of level of the sound that's arriving at the left ear versus the right ear.

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Q How would you define level in this context?

A In this context in the same way as we did before, it's the difference in intensity between the left and the right ear. In fact, the ILD is sometimes referred to as the IID, the interaural intensity difference.

Q The third cue you mentioned I think was spectral coloration, did I get that right?

A Yes.

Q Okay. Tell me about spectral coloration.

A So spectral coloration refers to the filtering characteristics that the size of our head, our bodies, our torsos, and in particular our pinnas or the outer part of the ear, how those contribute to changing the color of the sound that arrives in each ear depending on the direction that that sound is coming from.

Q What do you mean by changing the color of the sound?

A I mean, changing the frequency spectrum of the sound.

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Q What does that mean?

A It means, it for example, maybe attenuating a particular frequency and boosting another frequency depending on the direction of the sound that it's coming from.

MR. HENRY: Counsel, I have to interrupt. It appears our videographer has disconnected.

MS. PIANA: Oh, dear.

MR. HENRY: It's a good time for a break. We've been going for a little over an hour.

MS. PIANA: Yes, sounds good. Let's go off the record and we'll come back in, say, 10 minutes or so.

AV TECH PLUMMER: And I will try to get a hold of him.

MS. PIANA: Okay. Thank you, Mr. Plummer.

(A recess was had.)

THE VIDEOGRAPHER: We are going back on the record at 10:55 a.m. Eastern time.

THE WITNESS: It's 11:55 Eastern time time.

THE VIDEOGRAPHER: Central time. You may

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1 begin.
2 MS. PIANA: All right. Thank you.
3 BY MS. PIANA:
4 Q Dr. Roginska, before the break we were
5 talking about what it means to change the color of
6 the sound. I'll just restate my last question.
7 So what does it mean to change the
8 frequency spectrum of the sound?
9 A It means to attenuate or lower certain
10 frequencies in the spectrum.
11 Q What do you mean by attenuate?
12 A Make them lower in level or volume.
13 Q So you mentioned it means to attenuate or
14 lower certain frequencies of the spectrum.
15 What does it mean to lower a frequency of
16 the spectrum?
17 A It means to in general terms increase or
18 decrease the level of a particular frequency.
19 Q I think you said lower a frequency of the
20 spectrum, right, so would that include increasing
21 the frequency of the spectrum?
22 A Well, what I said was that you could --

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1 changing the spectral coloration means you're
2 either increasing or decreasing the level of a
3 particular frequency for each of the frequencies
4 that you want to affect.
5 Q What do you mean by a frequency?
6 A So I mean the frequencies that a human
7 hears, and that is between 20 hertz and
8 20 kilohertz.
9 Q How does a sound at a frequency of 20
10 hertz sound to a user versus a sound at
11 20 kilohertz?
12 A Well, a sound at 20 hertz is a very low
13 frequency. It's the lowest frequency that a human
14 typically can hear. Of course, that depends on
15 age. And then a sound that is at 20 kilohertz is
16 a very high frequency is and typically is at the
17 highest range at which a human ear can hear.
18 Q A sound at 20 hertz you mentioned is at a
19 low frequency.
20 Would that mean that it sounds to a user
21 to be a low or a deep sound as opposed to a high
22 pitched sound?

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1 A A sound at a low frequency sounds like
2 this... and a sound at a high frequency sounds...
3 so low pitch/high pitch.
4 Q All right. Thank you. I didn't even hear
5 your high frequency sound so maybe I need to get
6 my ears checked, but that's another subject.
7 Okay. So you were talking about binaural
8 sound has these three important cues, the ITD, the
9 ILD and this spectral coloration.
10 Does mono sound have those same cues, any
11 of them?
12 A Mono sound doesn't have interaural time
13 differences, mono sound doesn't have interaural
14 level differences, mono sound -- a sound in a
15 monophonic signal can be changed in frequency,
16 sure, an equalizer, for example, might do that,
17 but it wouldn't have the spectral coloration that
18 as I mentioned before the head, the torso, and in
19 particular the pinna, the outer ears would
20 superimpose on the sound that is reaching an ear,
21 a monophonic sound would not have that.
22 Q What about a stereo sound, would a stereo

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1 sound have any of these three important cues?
2 A So a stereo sound wouldn't have ITDs. A
3 stereo sound does have level differences between
4 the left and the right channel, but they're not
5 necessarily the interaural level differences.
6 Q Can you explain what you mean by that?
7 A Sure. Interaural level differences are
8 level differences that occur because of the
9 attenuation that happens. Because of the head,
10 the head behaves as an obstacle when the sound is
11 coming from one particular direction.
12 So the interaural level differences are
13 specific to how the size and the shape of the head
14 impact the sound arriving at the left and the
15 right ear that's binaural.
16 Stereo means when you're adjusting the
17 level of the left and the right channel it doesn't
18 necessarily have to be interaural level, it could
19 just be a level adjustment.
20 Q Would stereo have an interaural level
21 adjustment?
22 MR. HENRY: Objection to form.

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1 BY THE WITNESS:
2 **A A stereo signal might have a level**
3 **difference, but, I mean, it may coincidentally be**
4 **the same as a value for an interaural level**
5 **difference, but it would not be an interaural**
6 **level difference.**
7 **BY MS. PIANA:**
8 Q What are some of the advantages of using
9 binaural sound?
10 MR. HENRY: Objection to form, ambiguous.
11 BY THE WITNESS:
12 **A Can you be more specific and with regards**
13 **to what?**
14 **BY MS. PIANA:**
15 Q Sure. How about a virtual reality game,
16 what are some of the advantages of using binaural
17 sound in a virtual reality claim?
18 **A So binaural sound allows you to position**
19 **an object at a specific location in a**
20 **three-dimensional space, so around a listener.**
21 Q Can you tell me what you mean by
22 "positioning an object"?

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1 **A Sure, when you have an element in a game,**
2 **binaural sound gives you the capability of**
3 **positioning the sound to appear as it's coming**
4 **from that specific location.**
5 Q So are you saying that a binaural sound
6 allows you to know the location of the sound
7 source?
8 **A Well, the cues that are contained in**
9 **binaural sound, ITDs, ILDs and spectral coloration**
10 **together allow you to position a sound and process**
11 **the sound with the intent of putting it in a**
12 **specific location. How the user perceives that,**
13 **you know, that's a whole other question, but**
14 **through the process of adding the cues of the ITD,**
15 **ILD and spectral coloration, we can attempt and**
16 **position the sound in a particular location.**
17 Q Can stereo sound do that?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 **A Stereo sound because it does not have**
21 **those three cues that I mentioned, while with**
22 **stereo sound the apparent phantom image as we call**

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1 **it might shift by stereo sound will not allow you**
2 **to position the sound in a three-dimensional**
3 **space.**
4 **BY MS. PIANA:**
5 Q What about mono sound?
6 **A Mono sound doesn't allow you -- it doesn't**
7 **have the capability to locate a sound in a**
8 **three-dimensional space.**
9 Q So the only type of sound that allows you
10 to locate an object -- strike that.
11 The only type of sound that allows you to
12 locate a sound in a three-dimensional space is
13 binaural?
14 MR. HENRY: Objection to form,
15 mischaracterizes testimony.
16 BY THE WITNESS:
17 **A I don't think your question was**
18 **technically accurate. Can you repeat that? I**
19 **want to make sure I get it right.**
20 **BY MS. PIANA:**
21 Q Sure. You mentioned that binaural sound
22 allows you to position the sound in a particular

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1 location; is that correct?
2 **A So the cues that we mentioned, the ITD,**
3 **ILD and spectral coloration give you the ability**
4 **to position a sound in a three-dimensional space.**
5 Q And you mentioned that or you testified
6 that stereo sound does not have the ability of
7 positioning a sound in a three-dimensional space;
8 is that correct?
9 MR. HENRY: Objection to form.
10 BY THE WITNESS:
11 **A I testified that stereo sound does not**
12 **give you the ability to position a sound in**
13 **three-dimensional space.**
14 **BY MS. PIANA:**
15 Q You also testified that mono sound doesn't
16 give you the ability to position the sound in a
17 three-dimensional space; is that correct?
18 **A That's correct.**
19 Q So the only type of sound that gives you
20 the ability to position a sound in a
21 three-dimensional space is binaural; is that
22 correct?

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1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 **A No, that's -- well, that's not the only**
4 **kind of sound. There are other techniques and**
5 **methods of positioning sound in a**
6 **three-dimensional space besides binaural sound.**
7 **BY MS. PIANA:**
8 Q Are those other techniques stereo sound?
9 **A Stereo wouldn't allow you to position a**
10 **sound in three-dimensional space.**
11 Q And you already testified that mono sound
12 does not give you the ability to position a sound
13 in three-dimensional space, correct?
14 MR. HENRY: Objection to form, asked and
15 answered.
16 BY THE WITNESS:
17 **A That's right.**
18 **BY MS. PIANA:**
19 Q So what are these other techniques besides
20 binaural sound that would give you the ability to
21 position a sound in three-dimensional space?
22 **A I can give you some examples. There are**

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1 **many.**
2 Q Okay.
3 **A Examples of techniques include surround**
4 **sound, there is wave field synthesis, there is**
5 **object-based audio, those are just a few examples.**
6 Q Are these examples that you just listed,
7 surround sound, wave field synthesis and
8 object-based audio are those different than
9 binaural sound?
10 **A Yes.**
11 Q Let's look at your declaration which we've
12 marked as Exhibit 1 already. This is your '179,
13 '184 declaration and let's go to Paragraph 99.
14 That's great. Thank you for blowing that up.
15 Dr. Roginska, do you see Paragraph 99 here
16 on the screen?
17 **A I do.**
18 Q Let me ask you what did you intend by this
19 testimony -- I'm sorry, about this opinion in
20 Paragraph 99?
21 **A Let me just reread this.**
22 **Well, I intended exactly what I said, that**

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1 **to provide realistic sound in the VR environment,**
2 **a person of ordinary skill in the art would have**
3 **been motivated to use binaural sound as taught by**
4 **Osman; for example, a POSA would have understood**
5 **that 3D sound can contribute to the sense of**
6 **immersivity in a 3D environment as stated in**
7 **Begault, Exhibit 1038, 13 to 14. 3D audio and**
8 **binaural synthesis may be used in applications**
9 **such as games, virtual reality or augmented**
10 **reality to enhance the realism of**
11 **computer-generated sound effects supplied to the**
12 **user stated in there.**
13 **Further, using binaural sound in VR**
14 **enables users to work more effectively because**
15 **appropriate sounds seemingly emits from their**
16 **proper locations as stated in Begault.**
17 Q All right. So in that second sentence
18 where you say: "For example, a POSA would have
19 understood that 3D sound can contribute to the
20 sense of immersivity in a 3D environment," are you
21 referring to a POSA in 2015 or a POSA in 2019?
22 **A I'm referring to a POSA, again, that would**

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1 **have had the level of education and background**
2 **that I stated earlier. The fact that -- 3D sound**
3 **and that's been contributing to the sense of**
4 **immersivity in a 3D environment as stated by**
5 **Begault has been known and implemented for a very**
6 **long time.**
7 Q Are you saying that the knowledge that a
8 POSA would have been applying in 2015 would be the
9 same as the knowledge as a POSA would be applying
10 in 2019 to understand that 3D sound can contribute
11 to the sense of immersivity in a 3D environment?
12 **A I'm saying a POSA, again, would have been**
13 **a person with that level of education and**
14 **background, industry or research experience, the**
15 **POSA would have understood for a very long time**
16 **that since 3D has been applied and used in systems**
17 **for decades, before this as stated in Begault they**
18 **would have known that a 3D sound can contribute to**
19 **the sense of immersivity in a 3D environment.**
20 Q Are you saying with respect to this
21 sentence in your declaration, there is no
22 difference from what a POSA in 2015 would have

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1 understood about the technology and what a POSA in
2 2019 would have understood about the technology of
3 3D sound and a sense of immersivity?
4 MR. HENRY: Objection to form, asked and
5 answered.
6 BY THE WITNESS:
7 **A Again, as I said before a person in 2015**
8 **or 2019 would have, again, I'm looking at the same**
9 **background, same experience of the education**
10 **background and the two years of industry or**
11 **research experience. It has been known and**
12 **understood for decades that applying 3D sound does**
13 **contribute to the sense of immersion in a**
14 **three-dimensional environment.**
15 **BY MS. PIANA:**
16 Q How does applying 3D sound contribute to
17 that sense of immersivity in a 3D environment?
18 **A Well, 3D sound enables a person to -- so**
19 **3D -- as I state here, 3D audio, binaural**
20 **synthesis in particular, can be used in**
21 **applications such as games, virtual reality or**
22 **augmented reality to enhance the realism of a**

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1 **computer-generated sound effect that is supplied**
2 **to the user and by that helps improve the**
3 **immersivity in the 3D environment.**
4 Q How does 3D audio or binaural synthesis
5 enhance that synthesis of the 3D sound effect as
6 stated in your declaration?
7 **A It helps contribute because 3D sound**
8 **allows you to position sounds around a listener.**
9 Q Is 3D sound the same as binaural sound?
10 MR. HENRY: Objection to form. Asked and
11 answered.
12 BY THE WITNESS:
13 **A Binaural sound is a type of 3D sound. 3D**
14 **sound can be implemented using other methods, and**
15 **binaural is one of the ways that you can create 3D**
16 **sound.**
17 **BY MS. PIANA:**
18 Q Let's look at the next paragraph in your
19 declaration, Paragraph 100, and this paragraph is
20 quite long so I will direct you to -- feel free to
21 read the whole paragraph, but I'd like to
22 specifically ask you about the last portion of

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1 this paragraph that says: "Spacialized audio can
2 be useful to serve as a wave finding aid," and you
3 quote a VR Book there.
4 What is that VR Book?
5 **A Sorry, is your question just what the VR**
6 **Book is?**
7 Q Yes. That's my current question, yes.
8 **A Let me is just go to the exhibits.**
9 **So, the VR Book is a book that was written**
10 **by Jason Jerald in 2015. Sorry, is that the right**
11 **date? Yes, it was written by Jason Jerald in 2015**
12 **and contains descriptions of different aspects of**
13 **virtual reality and including the history of VR,**
14 **an overview of various realities, talking about**
15 **immersion presence reality tradeoffs, talks about**
16 **some aspects of perception in virtual reality. It**
17 **talks also about adverse health effects and about**
18 **content creation and interaction in design.**
19 Q Were you just reading from a document,
20 then, Dr. Roginska?
21 **A I was looking at, yes, Exhibit 1067.**
22 Q So you were looking at Exhibit 1067 to

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1 your declaration which is the VR Book; is that
2 correct?
3 **A That's correct.**
4 Q So we haven't entered Exhibit 1067 to your
5 declaration as an exhibit in this deposition yet.
6 You mentioned that this VR Book was
7 published in 2015; is that correct?
8 **A That's correct.**
9 Q Would a POSA in 2015 based on knowledge in
10 2015 have this knowledge from the VR Book?
11 **A They could if they read the book.**
12 Q Would this knowledge from the VR Book that
13 was published in 2015 would it have changed in
14 2019?
15 MR. HENRY: Objection to form. Ambiguous.
16 BY THE WITNESS:
17 **A What specific aspects in the book are you**
18 **referring to?**
19 **BY MS. PIANA:**
20 Q If this portion that you've quoted here in
21 Paragraph 100 of your declaration.
22 **A So the part that states that auditory cues**

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1 **pay crucial role in everyday life as well as VR**
2 **including adding awareness of surrounds, adding**
3 **emotional impact, cueing visual attention,**
4 **conveying a variety of complex information without**
5 **taxing the visual system, providing unique cues**
6 **that cannot be perceived through other sensory**
7 **systems, that sounds work well for creating**
8 **situational awareness and can obtain attention**
9 **independent of visual properties and where one is**
10 **looking, and that spacialized audio can be useful**
11 **to serve as a wave finding aid.**
12 **So if your question is whether this would**
13 **have changed between 2015 and 2019 that would not**
14 **have changed between 2015 and 2019.**
15 Q This content in paragraph of 11 of your
16 declaration that's quoted all came from this VR
17 Book, correct?
18 MR. HENRY: Objection to form. I think
19 you said Paragraph 11, Counsel, but we're not
20 looking at Paragraph 11.
21 MS. PIANA: Apologies. I'm at
22 Paragraph 100. Thank you. Let me restate.

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1 BY MS. PIANA:
2 Q This information that you quoted here in
3 Paragraph 100 of your declaration, Dr. Roginska,
4 all of that quoted material came from the VR Book,
5 correct?
6 **A That is correct.**
7 Q And so a POSA in 2015 would have this VR
8 Book to rely on; is that correct?
9 **A It was available to them.**
10 Q And would this information in
11 Paragraph 100 of your declaration still apply to a
12 POSA in 2019?
13 MR. HENRY: Objection to form, asked and
14 answered.
15 BY THE WITNESS:
16 **A The POSA would have been -- so a person --**
17 **somebody who has a bachelor's degree in computer**
18 **science and with two years of experience, so the**
19 **POSA would have been virtually the same person.**
20 **BY MS. PIANA:**
21 Q Right but you understand when we talk
22 about a POSA what we talk about is what a POSA

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1 would have known, correct?
2 **A Correct.**
3 Q So a POSA in 2019 would have had the
4 benefit of this VR Book that was published in
5 2015; is that correct?
6 **A A POSA in 2019 would have also had access**
7 **to this book, correct.**
8 Q So these statements these statements in
9 Paragraph 100 of your declaration is a POSA in
10 2015 would have had the same technical knowledge
11 based on the VR Book as a POSA in 2019, correct?
12 MR. HENRY: Objection to form, ambiguous.
13 BY THE WITNESS:
14 **A Again, when I think about a POSA when I**
15 **was preparing this declaration, the POSA was a**
16 **person of a particular experience, education as**
17 **well as industry or research experience, not two**
18 **different people.**
19 **BY MS. PIANA:**
20 Q Right. A POSA is not two different people
21 but a POSA in 2015 might have different knowledge
22 than a POSA in 2019, correct?

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1 MR. HENRY: Objection to form, asked and
2 answered, multiple times.
3 BY THE WITNESS:
4 **A It would depend on -- again, the POSA**
5 **would have been the same. The POSA would have had**
6 **that same educational background and still would**
7 **have had the two years of research or industry**
8 **experience and that is what I refer to as a POSA.**
9 **What specific information they would have they**
10 **would have access to books, they would have access**
11 **to other things.**
12 **So if there's a specific part of the**
13 **experience that you want to ask me about, I'm**
14 **happy to answer.**
15 **BY MS. PIANA:**
16 Q So what I'm trying to ask you about is
17 whether a POSA applying knowledge in 2015 would
18 have applied this VR Book and whether a POSA
19 applying knowledge in 2019 would have applied this
20 VR Book?
21 **A Any person in 2015 and 2019 who would have**
22 **had access to this book.**

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1 Q So the information in this Paragraph 100
2 of your declaration is an example where the POSA
3 applying knowledge in 2015 would have had the same
4 access as a POSA applying knowledge in 2019,
5 correct?
6 MR. HENRY: Objection to form.
7 BY THE WITNESS:
8 **A So what I said was a person -- so any**
9 **person in 2015 or later, right, between -- it**
10 **could be 2024, would have access to this book.**
11 **BY MS. PIANA:**
12 Q Right. But what we're looking at in
13 Paragraph 100 of your declaration is your opinion,
14 correct?
15 **A That's correct.**
16 Q And your opinion states that a POSA
17 understood and then you quote from this VR Book
18 that was published in 2015, correct?
19 **A Yes.**
20 Q So I'm trying to establish whether this is
21 a POSA in 2015 applying knowledge or a POSA in
22 2019 applying knowledge?

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1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 **A What Paragraph 100 states is that a POSA**
4 **understood, and by POSA, again, I mean a person**
5 **who at the time would have had a bachelor's degree**
6 **and would have had two years of experience in the**
7 **industry or in research, would have had access to**
8 **this 2015 book.**
9 **BY MS. PIANA:**
10 Q Are you talking about a 2015 POSA or a
11 2019 POSA?
12 MR. HENRY: Objection to form, asked and
13 answered, multiple times.
14 BY THE WITNESS:
15 **A So, again, the person of ordinary skill in**
16 **the art would have -- 2015, 2019 would have had**
17 **the same basic knowledge, the same fundamental**
18 **knowledge because if they've had an undergraduate**
19 **degree in computer science or engineering or music**
20 **technology and because they would have had two**
21 **years of industry or research experience.**
22 **BY MS. PIANA:**

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1 Q So are you saying that with regard to this
2 opinion in Paragraph 100 of your declaration it
3 doesn't matter whether we are applying a 2015 POSA
4 or a 2019 POSA?
5 MR. HENRY: Objection to form,
6 mischaracterizes testimony.
7 BY THE WITNESS:
8 **A So. No, what I said is that a person of**
9 **ordinary skill in the art would have had access to**
10 **this 2015 book.**
11 **BY MS. PIANA:**
12 Q And would a person of skill in the art in
13 2019 have had access to this 2015 book?
14 **A A person -- any person after the year 2015**
15 **would have had access to this book because it was**
16 **published in 2015.**
17 Q Right and the specific person we're
18 talking about here in your declaration generally
19 and in Paragraph 100 specifically is this person
20 of skill in the art, the POSA, right, not just any
21 old person, right, we're talking about a person of
22 ordinary skill in the art, correct?

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1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 **A So a POSA would have had access to this**
4 **book and would have understood -- if they read the**
5 **book would have understood what was in the book.**
6 **BY MS. PIANA:**
7 Q When you say a POSA understood here in
8 Paragraph 100 of your declaration, are you talking
9 about a POSA from 2015 or a POSA from 2019?
10 MR. HENRY: Objection to form, asked and
11 answered.
12 BY THE WITNESS:
13 **A So again a POSA, a person of ordinary**
14 **skill in the art as I applied the definition in my**
15 **declaration would have been a person who would**
16 **have had a bachelor's degree in the computer**
17 **science engineering field, music technology, and**
18 **would have had the two years of research or**
19 **industry experience.**
20 **BY MS. PIANA:**
21 Q Yes. I understand that's how you've
22 defined the POSA, but we've established already

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1 that what's important here is the knowledge that a
2 POSA would have, and we've also established that
3 there are two dates that you are applying in your
4 declaration for the definition of POSA. We looked
5 at that back in I believe it was Paragraph 34 of
6 your declaration.
7 So what I'm trying to understand is which
8 POSA are you talking about here in Paragraph 100?
9 Is it a POSA from 2015 applying knowledge in 2015
10 or is it a POSA from 2019 applying knowledge in
11 2019?
12 MR. HENRY: Objection to form, asked and
13 answered, mischaracterizes testimony,
14 mischaracterizes the document.
15 BY THE WITNESS:
16 A So what you said was incorrect. I am not
17 applying two different definitions, right. My
18 definition of POSA is very clear as I stated in
19 the paragraph that you just mentioned, and my
20 definition of POSA is a person with a certain
21 education level and a certain amount of
22 experience.

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1 BY MS. PIANA:
2 Q Which date is this paragraph based on,
3 this paragraph meaning Paragraph 100 of your
4 declaration?
5 A I'm not sure I understand your question
6 which date is it.
7 Q Is it a POSA applying knowledge in 2015 or
8 a POSA applying knowledge in 2019?
9 MR. HENRY: Objection to form, asked and
10 answered.
11 BY THE WITNESS:
12 A So the book was written in 2015. A
13 person -- a POSA would have had access to a
14 book -- to this book that was published in 2015.
15 This knowledge was common knowledge in 2015.
16 BY MS. PIANA:
17 Q So this book would have been knowledge of
18 a POSA applying knowledge in 2015?
19 A Since this book was published in 2015,
20 anybody after 2015 would have had access to the
21 book and would have -- could have been
22 knowledgeable in the content of this book, and

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1 the knowledge that I quote here was common
2 knowledge.
3 Q So a POSA applying knowledge in 2019 would
4 also have had knowledge of this VR Book?
5 A A person any time after 2015 would have
6 had access and knowledge about this book.
7 Q So this paragraph quoting the content from
8 the VR Book published in 2015 would have been
9 applied by a POSA in 2015 and also by a POSA in
10 2019, correct?
11 MR. HENRY: Objection to form. Asked and
12 answered.
13 BY THE WITNESS:
14 A Well, the definition of POSA doesn't
15 change. So a person of ordinary skill in the art
16 and with the same education level and background
17 that we discussed earlier would have had access to
18 and known the content of this book.
19 BY MS. PIANA:
20 Q So that person of ordinary skill in the
21 art in 2015 would have had access to this content
22 in this book and that person of ordinary skill in

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1 the art in 2019 also would have had access to the
2 contents in this book, correct?
3 A Well, any person in 2015 or later would
4 have had access to this book. The POSAs are not
5 different in 2015 or 2019. I mean, the level of
6 knowledge and background would have been virtually
7 the same.
8 Q You mentioned the POSAs are not different
9 in 2015 or 2019, and I understand that your
10 definition of a POSA as stated in paragraph 34 of
11 your declaration says it is somebody who would
12 have had a bachelor's degree in computer science
13 or engineering, music technology and at least two
14 years of industry experience or academic research
15 experience in virtual augmented reality, audio
16 engineering or an equivalent.
17 So the qualifications of your definition
18 of a POSA are not different from 2015 to 2019; is
19 that correct?
20 A The qualifications of the POSA that I
21 describe here are that they would have a
22 bachelor's degree in the fields that you just

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1 stated, and, in addition, they would have had at
2 least two years of industry or research
3 experience.
4 Q And those qualifications of the POSA as
5 mentioned in Paragraph 34 would not change in 2015
6 versus 2019, correct?
7 A The qualifications of the education and
8 the years of experience wouldn't -- would be,
9 yeah, the same, the qualifications.
10 Q But the knowledge that a POSA would apply
11 in 2015 versus 2019 can could be different,
12 correct?
13 A Well, what specific knowledge are you
14 talking about?
15 Q Well, this is your declaration,
16 Dr. Roginska. So I'm trying to understand when
17 you make a statement as you've done here in that
18 Paragraph 100 that a POSA understood the audio
19 cues, et cetera, whether that is applying the
20 knowledge of a POSA from 2015 or the knowledge of
21 a POSA from 2019?
22 MR. HENRY: Objection to form,

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1 argumentative.
2 BY THE WITNESS:
3 A Okay. So what is described in
4 Paragraph 100, that was common knowledge. That
5 was common knowledge in 2015. It was common
6 knowledge for years before that.
7 BY MS. PIANA:
8 Q So a POSA applying knowledge in 2015 would
9 have had access to this VR Book and a POSA
10 applying knowledge in 2019 would have had access
11 to this VR Book, correct?
12 A Again, you make it sound like they're two
13 different people, but the definition of POSA
14 doesn't change.
15 The POSA at the time of the priority date
16 for the '179 and '184 patents either 2015 or 2019,
17 they would have had the two years of industry and
18 research experience and they would have had a
19 bachelor's degree. Those are the qualifications
20 that I listed.
21 Q I understand. So the POSA qualifications
22 do not change. We've established that, that's

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1 very clear, but the knowledge that that same
2 person would have in 2015 versus 2019 could change
3 and so what I'm trying to understand is which date
4 are you referring to here in Paragraph 100 of your
5 declaration?
6 MR. HENRY: Objection to form, asked and
7 answered.
8 BY THE WITNESS:
9 A Well, this knowledge would have been
10 available, accessible, so the knowledge that I
11 quote in Paragraph 100 would have been available
12 and accessible to anybody in 2015 or later.
13 BY MS. PIANA:
14 Q Including in 2019?
15 A Including in 2019.
16 Q So this Paragraph 100 is an example of
17 where a POSA in 2015 would be applying the
18 knowledge and a POSA in 2019 would be applying
19 this same knowledge, correct?
20 MR. HENRY: Objection to form, asked and
21 answered.
22 BY THE WITNESS:

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1 A So as I said anybody 2015 or -- anybody in
2 2015 or later would have had access to the book
3 and could have applied the knowledge and would
4 have applied the knowledge and the content that
5 was in this book.
6 BY MS. PIANA:
7 Q Including a POSA in 2019, correct?
8 A Including -- yeah, including a person who
9 was working in this field in 2019.
10 Q So yes?
11 MR. HENRY: Objection to form.
12 BY THE WITNESS:
13 A So, again, as I said, so the POSA, the
14 definition of the POSA 2015/2019 doesn't change.
15 It's still the same background. It's still the
16 same education.
17 So my definition of POSA is based on the
18 level of education and experience, industry or
19 research experience.
20 BY MS. PIANA:
21 Q Right. But the knowledge that a person
22 who meets those qualifications could be different

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1 in 2015 versus 2019, correct?
2 MR. HENRY: Objection to form, asked and
3 answered.
4 BY THE WITNESS:
5 **A The level of -- did you say the level of**
6 **knowledge?**
7 **BY MS. PIANA:**
8 Q I said the knowledge or level of knowledge
9 if you prefer that?
10 MR. HENRY: Same objections,
11 argumentative.
12 BY THE WITNESS:
13 **A I guess depending on -- so depending on**
14 **the specific type of industry experience might be**
15 **a little different, but I am not looking at**
16 **specific experience. I'm looking at a person --**
17 **I'm using a POSA as a person who has that**
18 **undergraduate degree and who has -- who comes with**
19 **the experience that you get by working in the**
20 **industry or by working in academic research for**
21 **two years.**
22 **BY MS. PIANA:**

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1 Q Right. And so would you expect that
2 person's experience and level of knowledge in 2015
3 to be different than the level of knowledge of
4 someone with that same experience in 2019?
5 MR. HENRY: Objection to form. Asked and
6 answered.
7 BY THE WITNESS:
8 **A The -- I would expect them to be, no, more**
9 **or less the same in 2015 as in 2019.**
10 **BY MS. PIANA:**
11 Q Okay. More or less the same?
12 **A Yeah. I mean the -- because they have an**
13 **undergraduate degree, they have a couple of years**
14 **of industry or research experience. They would**
15 **be -- a POSA would be, you know, very similar at**
16 **those two times.**
17 Q So would the knowledge of a POSA in 2019
18 be enriched by whatever has happened in this
19 technological space from 2015 to 2019?
20 MR. HENRY: Objection to form.
21 BY THE WITNESS:
22 **A But that is not really relevant to my**

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1 **definition of POSA. I mean, every year a person**
2 **might have access to another book, but in 2015**
3 **when we're talking about this book, this book was**
4 **published in 2015, anybody in 2015 or later would**
5 **have access to this book and the same knowledge**
6 **that is in this book.**
7 **BY MS. PIANA:**
8 Q Right. So the opinions you state in
9 Paragraph 100 of your declaration are an example
10 of where a POSA applying knowledge in 2015 would
11 be applying the same knowledge as a POSA in 2019
12 based on this book that was published in 2015?
13 MR. HENRY: Objection to form, asked and
14 answered, ambiguous.
15 BY THE WITNESS:
16 **A A person in 2015 or later would have had**
17 **access to this book and could have used the**
18 **knowledge that is in this book.**
19 **BY MS. PIANA:**
20 Q So the knowledge of a POSA in 2015 and the
21 knowledge of a POSA in 2019 with respect to this
22 paragraph of your declaration, Paragraph 100,

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1 would have been the same, correct?
2 MR. HENRY: Objection to form.
3 BY THE WITNESS:
4 **A Again, a person in 2015 or later would**
5 **have had access to the book and any person after**
6 **2015 including today in 2024 would have access to**
7 **this book and to the knowledge of this book.**
8 **BY MS. PIANA:**
9 Q Perhaps I'm overcomplicating. I feel like
10 this is a very simple question so I'm going to try
11 again. Yes or no.
12 Would the knowledge of a POSA in 2015 and
13 the knowledge of a POSA in 2019 with respect to
14 this paragraph of your declaration, Paragraph 100,
15 have been the same? Yes or no.
16 MR. HENRY: Objection to form, asked and
17 answered.
18 BY THE WITNESS:
19 **A So I want to make sure that I am answering**
20 **your question.**
21 **So my answer to you is that the POSA, the**
22 **definition of POSA that I'm using is the person**

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1 **who has a bachelor's degree and has the relevant**
2 **experience. With the book having been published**
3 **in 2015, anybody, any POSA would have had access**
4 **to this book and, therefore, would have had access**
5 **to the knowledge that is contained in this book.**
6 **BY MS. PIANA:**
7 Q So any POSA would have had access to this
8 book including a POSA in 2019, correct?
9 **A Including -- yeah, a person -- a POSA in**
10 **2019.**
11 Q So a POSA in 2015 and a POSA in 2019 would
12 both be applying this knowledge from the VR Book
13 that's mentioned in Paragraph 100 of your
14 declaration, correct?
15 MR. HENRY: Objection to form.
16 BY THE WITNESS:
17 **A Well, a POSA, again, the definition of how**
18 **I use POSA is relevant to their educational**
19 **experience -- background, level of education and**
20 **amount of experience that they have and since this**
21 **book was published in 2015, anyone had access to**
22 **this book starting in 2015 and would have**

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1 **understood to go to this book to gain knowledge.**
2 **BY MS. PIANA:**
3 Q So you understand, Dr. Roginska, that this
4 concept of a POSA is very critical in determining
5 issues like the ones you've opined on in your
6 declaration including, you know, the validity of
7 patent claims, correct?
8 MR. HENRY: Objection to form, compound.
9 BY THE WITNESS:
10 **A I understand that, yes, the definition of**
11 **POSA is very important with respect to my opinions**
12 **in this case.**
13 **BY MS. PIANA:**
14 Q So how could a person know when reading
15 the opinions in your declaration which knowledge
16 the POSA is applying, knowledge from 2015 or
17 knowledge from 2019?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 **A When we talk about -- when I talk about a**
21 **POSA, I'm talking about the educational background**
22 **and the experience at the time of the priority**

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1 **date which is 2015 or their filing dates which is**
2 **2019.**
3 **BY MS. PIANA:**
4 Q So those are two different time periods,
5 right?
6 **A Those are two different years.**
7 Q So knowledge as of 2015 could be different
8 than knowledge as of 2019, right?
9 MR. HENRY: Objection. Asked and
10 answered.
11 BY THE WITNESS:
12 **A It could be. I mean, there's four years**
13 **between them, but my definition of POSA relates to**
14 **the education background and relates to the**
15 **experience that that person would have had.**
16 **BY MS. PIANA:**
17 Q So the educational background of someone
18 in 2015 would not have the benefit of anything
19 that was published after 2015, right?
20 **A Sure, uh-huh.**
21 Q So a POSA applying knowledge in 2015 would
22 not have the benefit of a book that was published

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1 in 2017, correct?
2 **A That's correct, yes.**
3 Q A POSA applying knowledge in 2019,
4 however, would have the benefit of a book that was
5 published in 2017, correct?
6 **A Well, any person in 2019 would have had**
7 **the access to a book that was published in 2017**
8 **and a person in 2015 wouldn't have access to that**
9 **book because it wasn't published yet, sure.**
10 Q Right. So a POSA applying knowledge in
11 2019 would have the benefit of a book that was
12 published in 2017, right?
13 MR. HENRY: Objection to form, asked and
14 answered.
15 BY THE WITNESS:
16 **A But when I describe a POSA, I am not**
17 **talking about specific books. I am talking about**
18 **a person's level of education, and I'm talking**
19 **about their amount of experience that they**
20 **have.**
21 **BY MS. PIANA:**
22 Q I understand. I'm just trying to get you

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1 to answer my question.
2 A person applying knowledge in 2019 --
3 sorry. Strike that.
4 A POSA applying knowledge in 2019 would
5 have the benefit of a book that was published in
6 2017, right?
7 MR. HENRY: Objection to form,
8 argumentative, asked and answered.
9 BY THE WITNESS:
10 A I think I answered that question that any
11 person in 2019 would have had access to anything
12 published before 2019.
13 BY MS. PIANA:
14 Q So is that a yes?
15 MR. HENRY: Objection to form.
16 BY THE WITNESS:
17 A Again, so my definition of POSA is related
18 to the particular background and education and
19 between 2015 and 2019, the background, shall the
20 bachelor's degree in computer science would not
21 be, you know, fundamentally different and so the
22 type of experience and the type of education I put

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1 in here for a POSA is virtually the same.
2 BY MS. PIANA:
3 Q I understand. I'm still trying to get you
4 to answer my question, and I understand Mr. Henry
5 has objected that it's been asked and answered,
6 but it hasn't been answered yet.
7 So would a POSA applying knowledge in 2019
8 have the benefit of a book that was published in
9 2017?
10 MR. HENRY: Objection to form, asked and
11 answered multiple times.
12 BY THE WITNESS:
13 A Yes, a person in 2019 would have the
14 benefit of a book -- would have access also to a
15 book that was published in 2017.
16 BY MS. PIANA:
17 Q So the knowledge of a POSA in 2019 who has
18 access to a book from 2017 would be different than
19 the knowledge of a POSA in 2015 who didn't have
20 access to that same book from 2017, correct?
21 MR. HENRY: Objection to form, ambiguous.
22 BY THE WITNESS:

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1 A They might. And I mean, they had access
2 to it. They -- if they read it, they would have
3 had the knowledge from that book.
4 BY MS. PIANA:
5 Q So if the POSA from 2019 had read the book
6 from 2017, the knowledge of the POSA in 2019 would
7 be different than the knowledge of the POSA in
8 2015, correct?
9 MR. HENRY: Objection to form, ambiguous
10 including with respect to what knowledge we're
11 talking about.
12 BY THE WITNESS:
13 A Well, I mean, it's a hypothetical, whether
14 that person they would have access to the book,
15 whether or not they will have read the book, but
16 I'm not basing my definition of POSA on that. I'm
17 basing my definition of POSA based on the
18 education level and based on the amount of
19 experience that that person has.
20 BY MS. PIANA:
21 Q So it is a hypothetical, I agree with
22 that. And in my hypothetical, I'm saying if the

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1 POSA from 2019 had read the book from 2017, the
2 knowledge of the POSA in 2019 would be different
3 than the knowledge of the POSA in 2015, correct?
4 MR. HENRY: Same objections. Incomplete
5 hypothetical.
6 BY THE WITNESS:
7 A I mean, it's hard for me to answer. The
8 thing I can tell you is that a person -- let's
9 just relate this back to the VR Book.
10 A person, any person, any POSA in 2015 or
11 later would have had access to the VR Book because
12 it was published in 2015.
13 BY MS. PIANA:
14 Q I understand that. My hypothetical is
15 different than the VR Book which was published in
16 2015.
17 So in my hypothetical, there's a book
18 that's published in 2017, and sitting here today,
19 can you tell me that a POSA in 2019 who has access
20 to a book and reads the book, this is my
21 hypothetical, reads the book from 2017 has a
22 different level of knowledge than a POSA from

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1 2015?
2 MR. HENRY: Objection to form, asked and
3 answered, ambiguous, incomplete hypothetical.
4 BY THE WITNESS:
5 A So in your hypothetical, which is a big
6 hypothetical, a person who is looking at the world
7 from a 2019 perspective and has access to books
8 and other things from earlier because they have
9 access to those books may possibly have a
10 different level of knowledge.
11 BY MS. PIANA:
12 Q So in your declaration, how can you tell
13 whether you are applying knowledge from a POSA in
14 2019 or a POSA in 2015?
15 MR. HENRY: Objection to form, asked and
16 answered, ambiguous.
17 BY THE WITNESS:
18 A Those are not two different people, right.
19 So a POSA is in my mind related to the level of
20 education and the level of experience regardless
21 of what kind of books they read in 2015 or 2016 or
22 2017. I'm here focused on the level of education

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1 and -- education and everything that comes along
2 with it, knowledge, the ability to read books, and
3 also the industry experience and everything that
4 comes along with that or the academic research
5 experience and everything that comes along with
6 that.
7 MR. HENRY: Counsel, we've gone past an
8 hour now. Is now a good time for a break?
9 MS. PIANA: Very soon. I'm just trying to
10 understand what Dr. Roginska just said.
11 BY MS. PIANA:
12 Q So the POSA is related to the level of
13 education and the level of experience, I
14 understand that, regardless of what kind of books
15 they read in 2015 or 2016 or 2017. So how do we
16 know what knowledge the POSA would have in 2015
17 versus 2019?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 A Well, a POSA because of their education
21 level and background and because, as I said,
22 education, the knowledge that comes with that, but

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1 also the -- everything else that comes along with
2 that including being able to go to a library or to
3 a bookstore and get a book and read a book, a POSA
4 is a person who would have -- who has the ability,
5 who has the background knowledge and has the
6 ability and possibly the experience, the two years
7 of research or industry experience to have that
8 background knowledge for a person that I consider
9 to be a POSA for these patents.
10 BY MS. PIANA:
11 Q So the background knowledge that a POSA
12 would have had in 2015 as you've described the
13 POSA who can go to the library or the bookstore
14 and read a book, that background knowledge of a
15 POSA in 2015 could be different than the
16 background knowledge of a POSA in 2019, correct?
17 A Well, there were different books published
18 between 2015 and 2019, sure.
19 Q Right. So is your opinion in
20 Paragraph 100 based on the POSA with the
21 background knowledge of 2015 or a POSA with the
22 background knowledge in 2019?

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1 MR. HENRY: Objection to form, asked and
2 answered multiple times.
3 BY THE WITNESS:
4 A It's the same. The book -- I mean, the
5 POSA has the level of education, has the
6 experience that I stated. This book was published
7 in 2015. Anybody after the year 2015 would have
8 had access to this book and this knowledge.
9 BY MS. PIANA:
10 Q So is your opinion in Paragraph 100 of
11 your declaration an example of where the
12 background knowledge of a POSA in 2015 would be
13 the same as the background knowledge of a POSA in
14 2019 because in Paragraph 100 you're citing a book
15 from 2015?
16 MR. HENRY: Objection to form, asked and
17 answered.
18 BY THE WITNESS:
19 A So what I'm saying is that in
20 Paragraph 100 I'm quoting from a book that was
21 written in 2015 and that contains knowledge that
22 would have been available and accessible to

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1 **anybody who would be reading this book which was**
2 **published in 2015.**
3 **BY MS. PIANA:**
4 Q So available and accessible to a POSA in
5 2015, right?
6 **A Available to a person in 2015.**
7 Q And also available and accessible to a
8 POSA in 2019, right?
9 **A But those are now two different people.**
10 **Again, when I think of a POSA, 2015, 2019, they**
11 **are now two different people. I'm always relating**
12 **it back to their education background and to the**
13 **amount of research or industry experience that**
14 **they would have.**
15 **And I would like to take a break before**
16 **we -- I would like to take a break. It's been a**
17 **little over an hour and I need a bio break.**
18 MR. HENRY: Let's go off the record.
19 MS. PIANA: One more question.
20 MR. HENRY: The witness has asked for a
21 break, for a rest room break. Let's go off the
22 record. You can ask your question after we come

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1 back.
2 MS. PIANA: I need 60 seconds.
3 MR. HENRY: She needs a bio break. Let's
4 go off the record.
5 MS. PIANA: Okay. We'll go off the
6 record.
7 THE VIDEOGRAPHER: We are going off the
8 record at 12:05 p.m. Central time.
9 (A recess was had.)
10 THE VIDEOGRAPHER: We're going back on the
11 record at 12:21 p.m. Central time.
12 BY MS. PIANA:
13 Q All right. So, Dr. Roginska, before the
14 break we were talking about the POSAs, 2015 POSA
15 and 2019 POSA, and you mentioned that you are
16 relating it back to their education, background
17 and the amount of research or industry experience
18 that they would have. Before I follow up on that
19 question, we had a break, I hope you're more
20 comfortable now.
21 Did you talk with your attorney during the
22 break?

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1 **A I talked with my attorney.**
2 Q Did you talk with your attorney about this
3 concept of the 2015 POSA and the 2019 POSA?
4 **A No.**
5 Q Are you aware that it is against the PTAB
6 guidelines to talk with your attorney about your
7 testimony during the breaks?
8 **A I am.**
9 Q Let's go back to where we were before.
10 So you mentioned that when you think of
11 POSA, you are relating it back to their
12 educational background and the amount of research
13 or industry experience that they would have?
14 Do you recall that?
15 **A I do.**
16 Q Before the break, you had said that the
17 amount of background knowledge that a POSA would
18 have in 2015 could be different than the amount of
19 background knowledge that a POSA would have in
20 2019, correct?
21 **A I think what I said was that in 2015, the**
22 **access to the knowledge in 2015 versus in 2019 the**

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1 **books that were published would have been clearly**
2 **different so a person in 2019 would have had**
3 **access to all of the publications prior to 2019.**
4 Q Right. And whereas a person in 2015 would
5 not have access to any of those publications that
6 had not yet been published in 2015, correct?
7 **A That's fair to say.**
8 Q That's pretty straightforward, right?
9 **A Yes.**
10 Q Time machines haven't been invented yet
11 that I am aware of, right?
12 **A Not yet.**
13 Q Maybe that will be our next deposition.
14 Let's move on to some other terms. We've
15 talked about binaural sound, mono sound, stereo
16 sound, ILDs, ITDs.
17 What about an audio cue, what is an audio
18 cue?
19 **A An audio cue is a sound that is meant to**
20 **indicate something or to notify about something.**
21 Q Okay. And so what kinds of somethings
22 would an audio cue indicate? What are some

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1 examples?
2 **A An audio could be really anything, it's**
3 **the beep in your microwave or when you don't have**
4 **your seatbelt on in the car or an audio cue could**
5 **be also a sound that has been maybe even modified**
6 **in some way to indicate something. I mean, it's a**
7 **very general question and there are lots of**
8 **examples.**
9 Q Okay. So I might hear a beep when
10 microwave goes off.
11 Would that be an example of an audio cue?
12 **A It's technically an auditory display that**
13 **acts as an audio cue to indicate something.**
14 Q Can you help me understand the difference
15 between an audio cue and an auditory display?
16 **A An auditory display is a term that is used**
17 **for a sound that has some meaning, right. As I**
18 **mentioned to you my microwave beep example that**
19 **indicates that your food is done or something like**
20 **that.**
21 **An audio cue can be anything in audio that**
22 **is used as a cue. It could be the sound itself.**

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1 **It could be the way that sound is processed, okay,**
2 **that sound is filtered could be an audio cue.**
3 Q Okay. So is it fair to say that microwave
4 beep is an example of an audio cue? I'll stop
5 there.
6 **A I would describe that -- I would qualify**
7 **that as an auditory display.**
8 Q Okay. So what would be an example of an
9 audio cue?
10 **A Anything in an audio signal that is meant**
11 **to be a cue, so anything inside an audio signal**
12 **like as I said before, it could be the content, it**
13 **could be how it's processed, it could be the**
14 **level, it could be really anything.**
15 Q Okay. But it would not be the beep when
16 microwave goes off?
17 **A Well, that would be an example of the**
18 **content, right, so the beep would be the content**
19 **of the sound.**
20 Q Okay. So the beep when microwave goes off
21 would be the content of the audio cue?
22 **A Well, as I said a moment ago, a audio cue**

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1 **can be any of those components, right. So it**
2 **could be the content itself, it could be --**
3 **something about the audio could be the level, it**
4 **could be how maybe that sound is filtered, how it**
5 **is presented, it could be any of those things can**
6 **be an audio cue.**
7 Q Okay. But the beep on microwave would be
8 one example of an audio cue?
9 **A Sure.**
10 Q Okay. But there are other examples of
11 audio cues, like it may have to do with the volume
12 of the sound perhaps? Would that be an example of
13 an audio cue?
14 **A That's fair to say.**
15 Q So what does it mean to alter an audio
16 cue?
17 **A Well, I think that it depends on the**
18 **context. Is there some somewhere specific that**
19 **you would like me to look at?**
20 Q Sure. Let's look at the '179 patent.
21 MS. PIANA: So, Mr. Plummer, if you could
22 pull from our exhibits the document entitled '179

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1 patent.
2 AV TECH PLUMMER: One moment.
3 MS. PIANA: And mark that as I think we're
4 up to Exhibit 2.
5 (A certain document was marked Roginska
6 Deposition Exhibit 2 for identification,
7 as of 02/27/2024.)
8 AV TECH PLUMMER: That's right.
9 BY MS. PIANA:
10 Q Here we are with Exhibit 2.
11 Dr. Roginska, do you recognize this
12 document?
13 **A I do. I'm pulling up the paper version of**
14 **this because it's easier for me to see in paper**
15 **but, yes, I do see the document.**
16 Q The paper version that you are pulling up
17 is a clean copy without any handwritten notes or
18 and notations?
19 **A That's correct.**
20 Q Great. Why don't we turn to Claim 1 which
21 is towards the back, the bottom of the document.
22 I don't have the PDF page number, but if you just

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1 keep scrolling, it's the second to last page if
2 that's helpful. Perfect. Right there.
3 Excellent. You read my mind. Thank you for
4 blowing that up.
5 Dr. Roginska, do you see Claim 1 of the
6 '179 patent up here on the screen?
7 A I do.
8 Q Do you understand that this is one of the
9 claims at issue in the IPR proceeding?
10 A That's right.
11 Q Okay. Great. So Claim 1 has five
12 subsections and I have another version of this
13 claim that has -- that's annotated with the
14 subsections but let's see how we can do with this
15 version.
16 If you look down at the last subsection
17 that starts with the word warning, do you see
18 that?
19 A I do.
20 Q It's about at line, what is that, maybe
21 28, so column 46, Line 28, and this subsection of
22 Claim 1 says: "Warning the user that the user is

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1 leaving the 3D virtual environment by filtering,
2 by the DSP, the binaural sound to alter audio cues
3 to prevent the user from experiencing external
4 localization of the sounds and by lowering a
5 volume of the sounds being provided to the user".
6 Do you see that?
7 A I do.
8 Q There's a lot in that one subsection so
9 we'll take it piece by piece. But before we
10 pulled up the '179 patent as Exhibit 2, I had
11 asked you about the meaning of alter and audio cue
12 and you asked for some context. This is the
13 context that I was looking for your response in.
14 So what does it mean to alter an audio cue
15 in the context of the '179 patent?
**16 A Thank you for the context because the
17 context is very important especially in this space
18 because here what is written in is the binaural
19 sound to alter audio cues to prevent the user from
20 experiencing external localization of the sounds
21 and by lowering the volume of the sounds being
22 provided to the user.**

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**1 So your question is what does alter mean;
2 is that right?**
3 Q Yes, that's correct. What does alter
4 audio cues mean in this context here in Claim 1 of
5 the '179 patent?
**6 A Yes. So in this context, alter audio cues
7 to prevent the user from experiencing external
8 localization of the sounds, and by lowering the
9 volume of the sounds being provided to the user
10 means that there would be a change, alter in
11 this case would mean a change in the audio cues
12 in a very specific way here, to prevent the user
13 from experiencing external localization of the
14 sounds.**
15 Q So what does external localization mean?
**16 A External localization or in this case from
17 experiencing external localization, in this case
18 external localization means that a sound is
19 positioned in a space, in a three-dimensional
20 space in this case, so that a user can locate that
21 sound externally from their head.**
22 Q Okay. Could you give me an example of

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1 when a user might be able to locate a sound
2 externally from their head?
**3 A An example of when a user can externally
4 locate a sound from their head is when there is a
5 person in front of you speaking to you, they are
6 it -- you are locating them externally outside
7 your head. It's the airplane that is flying above
8 your head. It's the car down the street. Those
9 are some examples.**
10 Q Got it. Thank you, that's helpful.
11 What about in the context of Claim 1 here,
12 so in Claim 1 we're not talking about hearing an
13 airplane in the sky, right?
14 A Right.
15 Q Or talking to somebody who's physically in
16 front of you, right?
17 A That's correct.
18 Q So what context are we talking about here
19 in Claim 1?
**20 A So the context here is that limitation
21 that starts with warning as we said, here the
22 context is warning the user that the user is**

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1 **leaving the 3D virtual environment by filtering**
2 **via DSP the binaural sound to alter the cues to**
3 **prevent the user from experiencing external**
4 **localization of the sounds. And by lowering the**
5 **volume of the sounds being provided to the user.**
6 **So here the context is warning the user**
7 **that the user is leaving the 3D virtual**
8 **environment.**
9 Q So what does it mean to you to leave the
10 3D virtual environment?
11 **A To me what it means to leave a 3D virtual**
12 **environment is when I am leaving a virtual**
13 **environment to go into another environment, most**
14 **likely a physical environment.**
15 Q So what about the significance of 3D, what
16 does it mean to leave a 3D virtual environment?
17 **A The 3D -- here I think it's important with**
18 **the word virtual, the 3D virtual environment**
19 **virtual environment just emphasizes the fact that**
20 **it's in three dimensions.**
21 Q Which environment is in three dimensions?
22 **A The 3D, the 3D -- the virtual environment**

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1 **is in 3D.**
2 Q Okay. So you're saying the virtual
3 environment is 3D?
4 **A That's what it says here.**
5 Q Does a 3D virtual environment require
6 visual images?
7 **A It can have virtual images.**
8 Q Can you have a 3D virtual environment
9 without any virtual images?
10 **A You can have a -- I mean, typically a 3D**
11 **virtual environment would be culmination of audio**
12 **and visual, but if I'm even in a virtual**
13 **environment with images and I close my eyes, I**
14 **don't have the visual images anymore but I'm still**
15 **in the virtual environment but it's typical that a**
16 **virtual environment would have both audio and**
17 **visual cues.**
18 Q But a 3D virtual environment could only
19 have sound, correct?
20 **A I suppose it could.**
21 Q And the 3D virtual environment that has
22 sound it stands to me, but tell me if you

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1 disagree, that sound could be 3D sound, do you
2 agree?
3 **A It could be.**
4 Q Let's get back to altering the audio cues
5 to prevent the user from experiencing external
6 localization of the sounds.
7 So this claim, Claim 1 includes binaural
8 sound.
9 Do you see that?
10 **A I see that.**
11 Q So that's in limitation we'll call that C,
12 it says processing by a digital signal processor
13 (DSP) in the HMD, sounds with the HRTFs to
14 generate binaural sound that is provided to the
15 user, correct?
16 **A Correct.**
17 Q What is happening in limitation E the
18 warning step where it says alter audio cues to
19 prevent the user from experiencing external
20 localization of the sounds?
21 **A What is happening is that the binaural**
22 **sound this that is processed by HRTFs as we've**

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1 **noted in limitation C that that binaural sound the**
2 **cues within the binaural sound and we mentioned**
3 **the cues before the break but those are the ITD,**
4 **ILD, spectral coloration, those are examples of**
5 **cues, those cues would be altered, changed it in**
6 **some way.**
7 Q So they would be changed to prevent the
8 user from experiencing external localization of
9 the sounds, correct?
10 **A That's correct.**
11 Q So does that mean that the binaural sound
12 is no longer binaural?
13 **A It means that the cues here it just says**
14 **that the cues of that binaural sound would be**
15 **altered with the intention of preventing the user**
16 **from experiencing external localization.**
17 Q Can a user experience external
18 localization in the context of Claim 1 without
19 binaural sound?
20 **A You would need binaural sound -- you would**
21 **need HRTF processing, you need binaural sound in**
22 **order to externalize the sound.**

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1 Q So to alter the audio cues to prevent the
2 user from experiencing external localization of
3 the sounds, does that mean the sound is no longer
4 binaural?
5 A Technically that's correct, the sound
6 would no longer be binaural.
7 Q What about lowering the volume of the
8 audio, would lowering the volume of the audio by
9 itself alter the audio cues to prevent the user
10 from experiencing external localization?
11 A So lowering the volume by itself, yes,
12 could alter sound localization.
13 Q If you lower the volume of binaural audio,
14 is it still binaural audio?
15 A It would be -- I mean lowering the volume
16 would degrade the binaural audio.
17 Q But would it still be binaural audio or
18 would it have been converted to something else?
19 MR. HENRY: Objection to form, incomplete
20 hypothetical.
21 BY THE WITNESS:
22 A Well, it depends. I mean, lowering the

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1 volume degrades the sound, degrades the audio and
2 may prevent what we just read which is
3 experiencing external localization.
4 Q Here in limitation 1-E that we've been
5 discussing, it says warning the user that the user
6 is leaving the 3D virtual environment by filtering
7 by the DSP, the binaural sound to alter audio cues
8 to prevent the user from experiencing external
9 localization of the sounds and by lowering a
10 volume of the sounds being provided to the user.
11 So here in Element 1-E there is an "and"
12 there, do you see that, Dr. Roginska?
13 A I see that.
14 Q So are you saying that lowering the volume
15 of the sounds is the same thing as altering audio
16 cues to prevent the user from experiencing
17 external localization of the sounds?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 A No, that's not what I said.
21 BY MS. PIANA:
22 Q So would lowering a volume of the sounds

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1 by itself prevent the user from experiencing
2 external localization?
3 MR. HENRY: Objection to form, incomplete
4 hypothetical.
5 BY THE WITNESS:
6 A Lowering the volume by itself would
7 degrade the sound.
8 BY MS. PIANA:
9 Q Would that degraded sound prevent the user
10 from experiencing external localization?
11 A It could.
12 Q What about the filtering by the DSP
13 portion of this limitation, what does that mean?
14 MR. HENRY: Objection to form.
15 BY THE WITNESS:
16 A Do you mean the warning the user that the
17 user is leaving the 3D virtual environment by
18 filtering by the DSP? Is that what you're
19 referring to?
20 BY MS. PIANA:
21 Q Yes, yes, thank you. That's what I was
22 referring to.

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1 What does it mean to filter by the DSP?
2 A It means to filter sound by a digital
3 signal processor.
4 Q What does it mean to filter sound?
5 A To process the sound.
6 Q Does filter mean the same thing as
7 process?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 A It doesn't mean exactly the same.
11 Filtering means to change, to process.
12 BY MS. PIANA:
13 Q Is the sound that's being filtered here in
14 limitation 1-E the binaural sound?
15 A So let me understand the question.
16 Are you asking if the sound that is being
17 filtered is the binaural sound?
18 Q Yes. That's what I'm asking.
19 A Can you rephrase because technically
20 that's not -- that's not correct. Can you
21 rephrase the question?
22 Q Sure. I'm trying to understand here

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1 limitation 1-E.
2 **A Uh-huh.**
3 Q Warning the user that the user is leaving
4 the 3D virtual environment by filtering by the DSP
5 the binaural sound, do you see that?
6 **A I see that, yes, okay.**
7 Q So why in your opinion is it incorrect to
8 say that the binaural sound is filtered by the
9 DSP?
10 **A I misunderstood your question, but thank**
11 **you for clarifying that.**
12 **So in this case to answer your previous**
13 **question the sound that is being filtered is the**
14 **binaural sound.**
15 Q Okay. So the binaural sound is a sound
16 that gets filtered by the DSP, correct?
17 **A That's correct.**
18 Q And then after the filtering in this
19 context in this claim here, the audio cues have
20 been altered to prevent the user from experiencing
21 external localization of the sounds.
22 Do you see that?

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1 **A I see that.**
2 Q So after the filtering of the binaural
3 sound, is it still binaural?
4 MR. HENRY: Objection to form.
5 BY THE WITNESS:
6 **A It would be -- I would say it would be**
7 **filtered binaural sound. It depends on how it**
8 **would be filtered by the DSP.**
9 **BY MS. PIANA:**
10 Q Okay. This claim says it would be
11 filtered to prevent the user from experiencing
12 external localization of the sounds.
13 So is sound that does not have any
14 external localization still binaural?
15 MR. HENRY: Objection to form, compound.
16 BY THE WITNESS:
17 **A So is your question is sound that doesn't**
18 **have -- that has altered cues to prevent the user**
19 **from experiencing external localization, is that**
20 **still a binaural sound?**
21 **BY MS. PIANA:**
22 Q That is my question, yes.

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1 **A So a sound that has been filtered to alter**
2 **the cues would be altered binaural sound. Now, if**
3 **the user is prevented from experiencing**
4 **localization, that just means that they cannot**
5 **localize the sound externally. But, in general, I**
6 **would say that if you filter the sound by the DSP**
7 **to alter the cues significantly and remove**
8 **binaural cues, right, so we're removing those**
9 **ILDs, ITD, spectral coloration that we talked**
10 **about before, to remove those cues, then that is**
11 **no longer binaural sound by definition.**
12 **BY MS. PIANA:**
13 Q What about filtered by the DSP the
14 binaural sound to alter audio cues to prevent the
15 user from experiencing external localization of
16 the sounds?
17 MR. HENRY: Objection to form.
18 BY MS. PIANA:
19 Q Is --
20 MR. HENRY: Sorry counsel, my apologies.
21 MS. PIANA: That's okay.
22 BY MS. PIANA:

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1 Q Is that still binaural sound?
2 **A Well, the cues have been altered to remove**
3 **the binaural cues, then that is no longer a**
4 **binaural sound.**
5 Q What about if the cues have been altered
6 to prevent the user from experiencing external
7 localization?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 **A So if they are being altered to prevent**
11 **the user from experiencing external localization,**
12 **so the word you know, experiencing, I'll just tell**
13 **you this, that experiencing external localization**
14 **is very difficult even with the HRTFs, right, so**
15 **we're talking about perception here.**
16 **I think what's important here is altering**
17 **audio cues to prevent the user from experiencing**
18 **external localization, which to me means you're**
19 **altering to the point of they are no longer there.**
20 **You no longer have the binaural cues of the ITD,**
21 **ILD spectral filtering, then the user will not**
22 **experience external localization.**

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1 **BY MS. PIANA:**
2 Q So if you are filtering by the DSP the
3 binaural sound to alter audio cues to prevent the
4 user from experiencing external localization of
5 the sounds, it's not binaural sound anymore,
6 correct?
7 MR. HENRY: Objection to form.
8 BY THE WITNESS:
9 **A Again, it depends on how you alter them**
10 **because as I said the definition of binaural sound**
11 **is sound that contains -- contains those three**
12 **ITD, ILD and spectral coloration. That's what**
13 **binaural sound contains so if you alter them to**
14 **the point of eliminating them, then you're**
15 **correct, then that is no longer binaural sound but**
16 **if you alter them in the way maybe it is just**
17 **degraded binaural or it could be stereo or it**
18 **could be something else. So it depends on how you**
19 **alter them.**
20 **BY MS. PIANA:**
21 Q I understand, here the claim says we are
22 altering the audio cues to prevent the user from

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1 experiencing external localization, right?
2 **A That's correct.**
3 Q So I understand there are lots of
4 different ways to alter audio cues, but here what
5 we're talking about in this Claim 1-E is we're
6 altering audio cues to prevent the user from
7 experiencing external localization of the sound.
8 And so if the user is prevented from
9 experiencing external localization of the sound,
10 is the sound still binaural?
11 MR. HENRY: Objection to form, asked and
12 answered.
13 BY THE WITNESS:
14 **A Yes. As I said, so if the user is**
15 **prevented from experiencing external localization,**
16 **then this means to me that the cues have been**
17 **altered to the point of eliminating the binaural**
18 **cues, and, therefore, the sound is no longer**
19 **binaural.**
20 **BY MS. PIANA:**
21 Q Okay. That's what this limitation says,
22 right, it says to prevent the user from

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1 experiencing external localization, right?
2 MR. HENRY: Objection to form, asked and
3 answered.
4 BY THE WITNESS:
5 **A That's what that limitation says, to alter**
6 **the audio cues to prevent the user from**
7 **experiencing external localization of the sounds.**
8 **BY MS. PIANA:**
9 Q Okay. And then the last part of this
10 limitation says: "And by lowering a volume of the
11 sounds being provided to the user".
12 Do you see that?
13 **A I see that.**
14 Q So we just established that the sound as
15 described in this Claim 1-E, the sound is no
16 longer binaural after the audio cues have been
17 altered to prevent the user from experiencing
18 external localization of the sounds so that sound
19 is no longer binaural and you lowering the volume
20 of that sound; is that correct?
21 MR. HENRY: Objection to form, compound,
22 mischaracterizes testimony.

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1 BY THE WITNESS:
2 **A So what the limitation says is that the**
3 **binaural sound is being -- we're altering the**
4 **audio cues of the binaural sound to prevent the**
5 **user from experiencing external localization of**
6 **the sounds and by lowering a volume of the sounds**
7 **being provided to the user.**
8 **BY MS. PIANA:**
9 Q So in this limitation 1-E, two separate
10 things happen to the sound, right? First the
11 binaural sound is filtered by the DSP to alter the
12 audio cues to prevent the user from experiencing
13 external localization of the sounds.
14 Do you see that?
15 **A Yes, I see that.**
16 Q So that's the first thing.
17 The second thing is and, secondly, by
18 lowering a volume of the sounds being provided to
19 the user.
20 Do you see that?
21 MR. HENRY: Objection to form.
22 BY THE WITNESS:

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1 **A I see that line and by lowering the volume**
2 **of the sounds being provided to the user.**
3 **BY MS. PIANA:**
4 Q Okay. So here in the context of this
5 claim, Claim 1 of the '179, the sound is altered
6 so it is no longer binaural so the volume is
7 lowered, correct?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 **A So this claim the audio cues of the**
11 **binaural sound are altered so the user no longer**
12 **experiences external localization so those are**
13 **altered, changed in some way and the user is also**
14 **warned, so I want to go back to the beginning of**
15 **that limitation, warning the user that the user is**
16 **leaving the 3D virtual environment, by filtering**
17 **by the DSP but also warning the user by lowering a**
18 **volume of the sounds being provided to the user.**
19 **BY MS. PIANA:**
20 Q Okay. So earlier you said that after the
21 sound is filtered by the DSP, to prevent the user
22 from experiencing external localization, after

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1 that process happens the sound is no longer
2 binaural, right?
3 MR. HENRY: Objection to form,
4 mischaracterizes testimony.
5 BY THE WITNESS:
6 **A I think what I said, I just want to**
7 **clarify, is that when we're filtering by the DSP**
8 **the binaural sound to alter the cues to the point**
9 **of preventing the user from experiencing external**
10 **localization, to me that means we're removing --**
11 **we're changing audio cues, that we're removing the**
12 **binaural cues in the sound to prevent external**
13 **localization.**
14 **However, the altered cues -- I mean, the**
15 **cues can be altered not to completely remove the**
16 **binaural cues, they could be diminished, they can**
17 **be degraded, you know, if we don't remove the ITD**
18 **or ILD, it would be another type of sound, if we**
19 **remove, this doesn't say remove, it says alter the**
20 **audio cues. Only if we remove the audio cues does**
21 **that sound become not binaural.**
22 **BY MS. PIANA:**

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1 Q Right, but the claim says you alter the
2 audio cues to prevent the user from experiencing
3 external localization.
4 Do you see that?
5 **A I see that.**
6 Q So if the user is prevented from
7 experiencing external localization, have the
8 binaural cues been removed?
9 MR. HENRY: Objection to form, asked and
10 answered.
11 BY THE WITNESS:
12 **A They could have been degraded. They don't**
13 **have to have necessarily been removed. They could**
14 **have been made worse, degraded. But that might**
15 **prevent the user from experiencing external**
16 **localization.**
17 **BY MS. PIANA:**
18 Q If a user is prevented from experiencing
19 external localization of the sound, is that sound
20 binaural?
21 MR. HENRY: Objection to form, asked and
22 answered.

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1 BY THE WITNESS:
2 **A The sound itself, I mean, the sound can**
3 **contain the binaural cues and so, by definition,**
4 **if sound contains binaural cues, it is a binaural**
5 **sound, but if the cues are degraded, altered the**
6 **cues are altered and the sound is degraded, that**
7 **might prevent the user from experiencing external**
8 **localization.**
9 **BY MS. PIANA:**
10 Q Okay. So a user could be prevented from
11 experiencing external localization even if the
12 binaural cues are still present in the sound?
13 **A That could happen and I want to just**
14 **differentiate between two things.**
15 **Binaural sound is the sound itself, right,**
16 **it's the signal, and binaural sound is a sound**
17 **signal that contains binaural cues inside the**
18 **signal as we talked about the ITD, ILDs, the**
19 **spectral coloration.**
20 **The second important thing is that that**
21 **line that starts to prevent the user from**
22 **experiencing external localization, that is an**

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1 experience. Now, what is contained in the signal
2 itself and what the user experiences, sometimes
3 they're the same, but if a binaural signal is
4 degraded or the cues are degraded, if the binaural
5 signal is degraded and the cues are still in the
6 sound, it may be altered, but that could
7 technically still be a binaural signal, but
8 because it is a degraded signal, that may prevent
9 the user from experiencing external localization.
10 Q So in that case where the binaural cues
11 have been degraded but it's still a binaural
12 signal, is the user experiencing the binaural
13 sound?
14 MR. HENRY: Objection to form, calls for
15 speculation.
16 BY THE WITNESS:
17 A I mean, so your question is if the cues
18 are degraded and it's still binaural sound, could
19 the user still be experiencing binaural sound?
20 BY MS. PIANA:
21 Q Yes. That's my question.
22 A Well, they may or may not be depending on

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1 how the cues were altered or degraded.
2 Q What if the cues are altered to prevent
3 the user from experiencing external localization?
4 A But, again, the binaural sound it can
5 still be a binaural sound, a binaural signal,
6 right. That may not change the characteristic of
7 the binaural signal. The experience that the user
8 has in experiencing external localization may
9 change depending on if the signal was degraded.
10 For example, if you have a binaural signal, turn
11 down the volume knob so that the binaural sound,
12 you know, has been degraded, maybe the person is
13 not going to be experiencing external
14 localization.
15 Q So I understand that.
16 Is the user experiencing binaural sound if
17 the user is prevented from experiencing external
18 localization?
19 MR. HENRY: Objection to form.
20 BY THE WITNESS:
21 A Can you repeat that question? It was a
22 lot.

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1 BY MS. PIANA:
2 Q Yes. Sure.
3 Is the user experiencing binaural sound if
4 the user is prevented from experiencing external
5 localization?
6 A If a user is not experiencing external
7 localization, then it wouldn't -- it wouldn't be a
8 binaural sound.
9 Q Okay. So here in limitation 1-E, it says
10 you warn the user by preventing the user from
11 experiencing external localization and by lowering
12 a volume of the sound, correct?
13 A So, yeah, you're warning the user that
14 they are leaving the 3D virtual environment by
15 filtering the binaural sound by altering the cues
16 so that they're not experiencing external
17 localization and you're also warning them by
18 lowering the volume of the sounds being provided
19 to the user.
20 Q Okay. You mentioned degrading in our
21 discussion of Claim 1, but Claim 1 does not
22 include the word degrade; is that right?

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1 A That's right.
2 Q Let's look at Claim 7. If we could scroll
3 down, it may be on the next page. It's at the
4 bottom. This one is going to be kind of tricky
5 but thank you.
6 Okay. So in Claim 7, and I'll give you a
7 moment to read it, Dr. Roginska, to familiarize
8 yourself with Claim 7.
9 A Yes. I have read it.
10 Q Okay. Great. So we're going to look at
11 the corresponding sub-limitation, which is I'll
12 call it 7-E, which is the 5th limitation in Claim
13 7. It's the one that starts with the words:
14 "Alerting the user..."
15 Do you see that?
16 A I see that.
17 Q Great. It's at the top of Column 47
18 around Line 3, so that limitation reads:
19 "Alerting the user that the user is leaving the
20 environment by altering processing of the binaural
21 sound to degrade audio cues in order to prevent
22 the user from experiencing external localization

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1 of the binaural sound".
2 Do you see that?
3 **A Yes.**
4 Q So some of the words in this limitation
5 7-E are similar or the same as the words in
6 limitation 1-E, but some of them are very
7 different. So let's go through it.
8 So in limitation 7-E it says: "Degrade
9 the audio cues in order to prevent the user from
10 experiencing external localization."
11 What does degrade audio cues mean in this
12 context?
13 MR. HENRY: Objection to form.
14 BY THE WITNESS:
15 **A So within the context of this limitation**
16 **alerting the user that the user is leaving the**
17 **environment by altering processing the binaural**
18 **sound to degrade audio cues in order to prevent**
19 **the user from experiencing external localization**
20 **of the binaural sound.**
21 **In this context, I read this as degrading**
22 **the audio cues could be a number of different**

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1 **audio cues, right, but the cues are degraded to**
2 **the point that the user is prevented from**
3 **experiencing the external localization of the**
4 **binaural sound.**
5 **BY MS. PIANA:**
6 Q Okay. Would the audio cues that are being
7 degraded as here in Claim 7 be the same as the
8 audio cues that are being altered in Claim 1?
9 MR. HENRY: Objection to form, ambiguous.
10 BY THE WITNESS:
11 **A Well, in Claim 1, limitation 1-E,**
12 **filtering the binaural sound to alter audio cues**
13 **to prevent -- I mean, they could be. They could**
14 **be a number of audio cues that are being altered**
15 **as in 7-E. But here in 7-E we have the specific**
16 **word of degrading audio cues, to degrade audio**
17 **cues.**
18 **BY MS. PIANA:**
19 Q Right. So what does it mean to you to
20 degrade audio cue in the context of this
21 limitation 7-E?
22 **A To make them worse.**

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1 Q What do you mean by that?
2 **A To change them in a way -- to change the**
3 **audio cues in a way, in a negative way so as to**
4 **prevent the user from experiencing the external**
5 **localization.**
6 Q So here in limitation 7-E, we say degrade
7 or the claim says rather: "Degrade the audio cues
8 in order to prevent the user from experiencing
9 external localization of the binaural sound."
10 Is that the same result as what was set
11 forth in limitation 1-E which was: "Alter the
12 audio cues to prevent the user from experiencing
13 external localization of the sounds?"
14 Do you end up in the same place here in
15 7-E as you do in limitation 1-E?
16 MR. HENRY: Objection to form, ambiguous.
17 BY THE WITNESS:
18 **A Well, in 1-E -- you may end up in the same**
19 **place in 1-E you're warning the user, I mean, the**
20 **goal is the same as to warn or alert the user that**
21 **they're leaving an environment.**
22 **The difference is also in 1-E we have the**

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1 **specific of the 3D virtual environment that**
2 **they're leaving, right.**
3 **BY MS. PIANA:**
4 Q Yes.
5 **A So --**
6 Q So -- sorry, go ahead.
7 **A I was going to say that you may end up in**
8 **the same place, but the goal here is to alert the**
9 **user that they are leaving in 1-E that they're**
10 **leaving the virtual environment, the 3D virtual**
11 **environment by processing.**
12 **In 7-E, that limitation states that the**
13 **user is leaving the environment by altering the**
14 **processing of the binaural sound to degrade the**
15 **audio cues so to make them worse, to diminish them**
16 **in order to prevent the user from experiencing**
17 **that external localization of the binaural sound.**
18 Q Wouldn't you agree that warning is the
19 same thing as alerting? Is that what you're
20 saying?
21 MR. HENRY: Objection to form.
22 BY THE WITNESS:

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A No. Warning and alerting is quite different.
BY MS. PIANA:
Q What are the differences?
A Well, when we are alerting we want to direct the attention of someone to something. When we are warning, a warning is typically related to safety or a hazard.
Q Would you of want to be alerted of a hazard?
A What do you mean?
Q Well, I understood your testimony to be that warning is different than alerting; is that right?
MR. HENRY: Objection to form.
BY THE WITNESS:
A Those are two different words with two different inherent meanings, yeah.
BY MS. PIANA:
Q Okay. And you testified that when we are warning, a warning is typically related to a safety or a hazard, right?

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A I mean, it could be. It could be. In this case warning the user that the user is leaving the 3D virtual environment is warning about a very specific thing.
Q And alerting the user, would you ever alert a user about a safety or a hazard?
MR. HENRY: Objection to form, incomplete hypothetical.
BY THE WITNESS:
A I guess you could alert them to a hazard, sure.
BY MS. PIANA:
Q In your mind, warnings are different than alerts?
MR. HENRY: Objection to form.
BY THE WITNESS:
A In my mind, a warning is a type of alert that carries a little bit more gravitas in its message.
BY MS. PIANA:
Q Would a person skill in the art have that opinion that a warning is a type of alert that

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carries more gravitas in its message?
A I think to anyone there's a difference between alerting and warning including a person of skill in the art.
Q And would it matter whether that person of skill in the art was applying knowledge as of 2015 versus applying knowledge as of 2019?
A I think any person regardless of when would know the difference between an alert and a warning signal.
Q You mentioned that the environment in Claim 7 is different than the environment -- strike that.
You mentioned that the term in Claim 1 is a 3D virtual environment and the term in Claim 7 is an environment, right?
A That's what those two lines say. One says 3D virtual environment and in 7-E it just states the environment.
Q As a person of ordinary skill in the art, do those terms have different meanings?
A Well, in 1-E it states very specifically

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3D virtual environment so it is very specific that this is a 3D virtual environment in 7E it states alerting the user that the user is leaving the environment. So that word doesn't specify a virtual environment.
Q When you had testified earlier, Dr. Roginska, that a 3D virtual environment might include a visual image or it could be just be a virtual sound environment, correct?
A It could be, but typically it would be an environment that includes both modalities.
Q When you say both modalities, could you just clarify what you mean there?
A Oh, sure. Including visual and audio.
Q Let's go to your declaration, which is Exhibit 1 and look at Paragraph 224.
MR. HENRY: Counsel, if you're transitioning, this might be a decent time to break for lunch. It's been an hour and the afternoon is getting away from folks on the east coast.
MS. PIANA: Has it already? I am

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1 transitioning, so that is fine. Let's break for
2 lunch. Should we take 45 minutes?
3 MR. HENRY: Yeah, why don't we try to hit
4 the top of the hour, but we can go off the record
5 and talk about it.
6 THE VIDEOGRAPHER: We are going off the
7 record at 1:22 p.m. Central time.
8 (A lunch recess was had from 1:22 p.m. to
9 2:03 p.m. CST.)
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1 A F T E R N O O N S E S S I O N
2 THE VIDEOGRAPHER: We're back on the
3 record at 2:03 p.m. Central time.
4 DR. AGNIESZKA ROGINSKA,
5 called as a witness herein, having been previously
6 duly sworn and having testified, was examined and
7 testified further as follows:
8 EXAMINATION (Resumed)
9 BY MS. PIANA:
10 Q Dr. Roginska, before we broke for lunch we
11 were talking about environment and 3D virtual
12 environment.
13 Do you recall that?
14 **A I do.**
15 Q You had made the point that the term used
16 in Claim 7 is environment, but the term in Claim 1
17 is 3D virtual environment; is that correct?
18 **A Yes, the term used in Claim 1-E is 3D**
19 **virtual environment, and the term that is used in**
20 **Claim 7-E is meeting the environment.**
21 Q While we're here at '179 patent which is
22 Exhibit 2, why don't we look at Claim 14.

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1 Can you tell me which term Claim 14 uses?
2 **A One second.**
3 So Claim 14 in the last limitation states:
4 "Alerting the user that the user is leaving the
5 environment by reducing a volume of the binaural
6 sound that localizes from the virtual image and
7 that is being provided to the user."
8 Q So would you agree that the term that's
9 used in Claim 14 is environment and not 3D virtual
10 environment?
11 **A In that limitation, that's right.**
12 Q Let's look at your declaration which is
13 Exhibit 1, and in particular let's go to
14 Paragraph 224, which should be around Page 138 of
15 the PDF. You're already there. Excellent.
16 So in this paragraph of your declaration,
17 Dr. Roginska, maybe you could read these two
18 sentences here for us for the record.
19 **A Sure. "In particular, all of the '179**
20 patent's claims directly (or indirectly via their
21 independent claims) recite the HMD/WED sensing or
22 determining when the user is leaving the 3D

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1 environment and alerting or warning that user of
2 that fact by reducing the sound's volume and/or
3 otherwise altering it. The patent does not
4 mention these features at all".
5 Q In that first sentence of your -- of
6 Paragraph 224 of your declaration, you say: "In
7 particular, all of the '179 patent's claims
8 directly or indirectly via their independent
9 claims recite the HMD/WED sensing or determining
10 when the user is leaving the 3D environment."
11 Do you see that?
12 **A That's correct.**
13 Q Where in Claim 7 does it say the user is
14 leaving the 3D environment?
15 **A In Claim 7, Limitation E states:**
16 **"Alerting the user that the user is leaving the**
17 **environment by altering processing of the binaural**
18 **sound to degrade audio cues in order to prevent**
19 **the user from experiencing external localization**
20 **of the binaural sound."**
21 **So here it states alerting the user that**
22 **the user is leaving the environment, right.**

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1 **And here if we go back to 224, in**
2 **particular all of the '179 patent's claims**
3 **directly or indirectly via their independent**
4 **claims recite the HMD/WED sensing or determining**
5 **when the user is leaving the environment and**
6 **altering or warning that user of that fact by**
7 **reducing the sound's volume and otherwise altering**
8 **it."**
9 **So is your question 3D environment versus**
10 **what is it stated in 7E leaving the environment?**
11 Q Yes, that is my question.
12 **A To me a 3D environment and environment are**
13 **really no different. So when 7-E states leaving**
14 **the environment and in 224 I say sensing or**
15 **determining when the user is leaving the 3D**
16 **environment, that is to me the same thing.**
17 Q Could a user leave a physical environment
18 and not leave a 3D virtual environment?
19 **A So could a user leave a physical**
20 **environment and not leave a 3D virtual**
21 **environment; is that the question?**
22 Q Yes. That's my question.

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1 **A I'm not sure I understand. Can you**
2 **rephrase, please?**
3 Q Sure. Well, let me back up.
4 As a person of skill in the art, are you
5 interpreting the term environment to mean the same
6 thing as the term 3D environment?
7 **A Yes. To me they are the same.**
8 Q And even though the term environment does
9 not include 3D in front of it?
10 **A Yes, I have a hard time imagining an**
11 **environment that is not a 3D environment.**
12 Q Are you making a distinction between a 3D
13 environment and a 3D virtual environment?
14 **A Yes.**
15 Q So the term in Claim 1 is a 3D virtual
16 environment, correct?
17 **A The term in Claim 1 is a 3D virtual**
18 **environment, that's correct.**
19 Q And here in your declaration at Paragraph
20 224, your testimony is that all of the '179
21 patent's claims directly or indirectly recite the
22 HMD/WED sensing or determining when the user is

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1 leaving the 3D environment, what kind of
2 environment are you referring to there as a 3D
3 environment?
4 **A Well, in this case it could be a virtual**
5 **environment, but it could also be a physical**
6 **environment.**
7 Q Okay. How would a POSA interpret the
8 difference between a 3D virtual environment and a
9 physical environment?
10 **A So a virtual environment means that you**
11 **are in a virtual -- virtual reality type of**
12 **environment. A physical environment means you're**
13 **in the real world.**
14 Q Okay. So let's go -- well, tell you what.
15 Let's go to Paragraph 225.
16 **A Yes.**
17 Q In this paragraph, you state that the '140
18 application and a clarification, do you understand
19 what the '140 application refers to?
20 **A I do.**
21 Q Can you tell me what that is?
22 **A So the '140 application is the most recent**

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1 **application, as a parent application to the '179**
2 **patent.**
3 Q What about the '184?
4 **A And also the '184 patent.**
5 Q Do you understand that the disclosure that
6 is given in the '140 application is the same as
7 the disclosure that is given in the '179 patent
8 and the '184 patent except for the claims?
9 **A I understand that the descriptions of the**
10 **'140 application are in the '179 patent, but that**
11 **there are -- but not all of them. So there are**
12 **two factors missing from the '140 application that**
13 **appear in the '179 patent.**
14 Q Okay. And what are those missing factors?
15 **A So I talk about these in my declaration.**
16 **In Paragraph 225, right where you are, let me just**
17 **refer to this, the '140 application does describe**
18 **a wide variety of different types of events that**
19 **may trigger changing sound from binaural sound to**
20 **stereo sound, mono sound, or altered binaural**
21 **sound.**
22 **That's taken from the '140 application,**

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1 Exhibit 128 (sic).
2 However, the '140 application does not
3 describe anywhere, including in the claims, the
4 triggering event of a user leaving the
5 environment, in other words, the '140 application
6 does not give an example of using the user's
7 location to determine that (and to warn or alert)
8 the user that the user is leaving the virtual
9 environment as recited in the claims.
10 Q I'm going to come back to that point in a
11 moment, but it just for clarity on the disclosure,
12 do you understand that the specification of the
13 '179 patent and the '184 patent are the same?
14 A The '179 patent and the '184 patent are
15 almost the same. The difference is in the
16 determining when the user is leaving the
17 environment. That is not present in the '184.
18 Q Sorry. I didn't mean to talk over you
19 there, Dr. Roginska.
20 When I say the specification of the '179
21 patent, do you understand that what I'm referring
22 to is the detailed description of the patent, that

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1 portion of the patent?
2 A I do.
3 Q Okay. And the claims of the patent are
4 the numbered paragraphs at the end. We've been
5 looking at some claims from the '179 patent,
6 correct?
7 A Yes.
8 Q So when I say that the specification of
9 the '179 patent is the same as the specification
10 as the '184 patent, what I mean to tell you is
11 that the drawings are the same and everything up
12 to the claims is the same in the '179 patent and
13 the '184 patent.
14 Do you understand that?
15 A Thank you for clarifying that. Yes. I
16 understand.
17 Q Sure. And then the '140 application as
18 you testified is the great-grandparent of both the
19 '179 and '184 patents, correct?
20 A I don't know about the great grandparent
21 but, yes, a parent application, that's correct.
22 Q Thank you. That's better.

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1 So the specification of the '140
2 application, and, again, when I say specification
3 I mean the drawings and all of the disclosure up
4 to the claims is the same as the specification of
5 the '179 patent and the '184 patent, correct?
6 A The specifications and the descriptions in
7 the '140 application is not the same.
8 Q Okay. How is it different?
9 A So in the description of -- hold on. Let
10 me go to the '140 application.
11 Q We can enter that as an exhibit if that
12 would be helpful. Why don't we do that.
13 MS. PIANA: Let's see. So Mr. Plummer, if
14 you could find in the exhibit folder, the document
15 that is entitled '140 application and mark that as
16 Exhibit 3.
17 (A certain document was marked Roginska
18 Deposition Exhibit 3 for identification,
19 as of 02/27/2024.)
20 MS. PIANA: Perfect.
21 BY MS. PIANA:
22 Q Dr. Roginska, recognize this document

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1 that's up on the screen and has been be marked as
2 Exhibit 3?
3 A Yes, I recognize the document.
4 Q So what is this document?
5 A So this document is the '140 application,
6 which is the most recent application, as a parent
7 application to the '179 and the '184 patent.
8 Q Okay. And so this document here includes
9 some additional information on top of the '140
10 application.
11 Do you see that? So, for example, the
12 page we're looking at here is called Issue
13 Notification. Do you see that?
14 A I see that, yes.
15 Q If you scroll down to -- I'm looking for
16 the --
17 MR. HENRY: Counsel, this was a bigger
18 document. Could you just give us a second be to
19 make sure it that we've downloaded local copies
20 that we can look through.
21 MS. PIANA: Sure.
22 MR. HENRY: Thanks.

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1 BY MS. PIANA:
2 Q So this document we're looking at that's
3 been marked as Exhibit 3 was marked as
4 Exhibit 1028 in the IPR if that is helpful for
5 you.
6 MR. HENRY: Yes, that's fine. I'm just
7 trying to pull down the Exhibit 3 that was just
8 stamped and circulated so I'm looking at the same
9 one.
10 MS. PIANA: Okay. Are you there?
11 MR. HENRY: I am, yes.
12 BY MS. PIANA:
13 Q If you scroll down to Page 92 in this --
14 yes, right there. Thank you.
15 This is the beginning of the application
16 that was filed as the '140 application, correct?
17 A We're on Page 92. Yes. Give me one
18 second. What page are you on?
19 Q I'm on the page that is shown on the
20 screen here. The page number at the bottom of the
21 document is Page 1, but the PDF page number is 92.
22 Do you see that?

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1 A I see that, thank you. Yes.
2 Q And so this is the specification of the
3 '140 application that was originally filed,
4 correct?
5 A That's the '140 application, uh-huh, yes.
6 Q And so the disclosure that is in the '140
7 application -- when I say '140 application, I mean
8 starting here at Page 92 of the PDF to the end of
9 the document. The disclosure that's in the '140
10 application is the same as the disclosure that's
11 in the '179 specification and the '184
12 specification.
13 Do you understand that?
14 A I understand that, yes.
15 Q Okay. Super. I just wanted to establish
16 that those three things were the same in terms of
17 the specification, not the claims. Claims are
18 different but the specifications are the same.
19 Okay.
20 Let's go back to your declaration, which
21 is Exhibit 1, and Paragraph 225. At the end of
22 this paragraph, you say: "In other words, the

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1 '140 application" which we've just established
2 what that is, "does not give an example of using
3 the user's location to determine that and to warn
4 or alert the user that the user is leaving the
5 virtual environment, as recited in the claims".
6 Do you see that?
7 A I see that, yes.
8 Q The claims, though, Claim 7 and Claim 14
9 use the term environment and not virtual
10 environment, correct?
11 A That's right.
12 Q And so are you saying in this sentence
13 here that virtual environment means environment as
14 used in Claims 7 and 14?
15 MR. HENRY: Objection. Form.
16 BY THE WITNESS:
17 A Well, what I'm saying here in
18 Paragraph 225 is that, again, the '140 application
19 does not give an example of using the user's
20 location to determine and to warn or alert the
21 user that the user is leaving the virtual
22 environment as recited in the claim.

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1 BY MS. PIANA:
2 Q Claim 7 does not recite the user is
3 leaving the virtual environment, correct?
4 A Claim 7, that was the 1 Claim 7 doesn't --
5 Claim 7 says leaving the environment.
6 Q And Claim 14 also says leaving the
7 environment, correct?
8 A Claim 7 -- Claim 14 states leaving the
9 environment.
10 Q So in your declaration, excuse me,
11 Paragraph 225, when you say: "The '140
12 application does not give an example of using the
13 user's location to determine that and to warn or
14 alert the user that the user is leaving the
15 virtual environment as recited in the claims."
16 Claim 14 and Claim 7 do not recite a
17 virtual environment, correct?
18 A They recite the environment which could
19 mean both the virtual or the physical environment,
20 but here what I'm saying is that the '140
21 application doesn't describe anywhere -- doesn't
22 recite or describe anywhere or give an example of

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using the user's location to determine and to warn or alert that the user is leaving the virtual environment.

Q Let's look at the '140 application. Great. You're back on Exhibit 3. Let's go to page -- well, it's 119 on the bottom, yeah, 119, great. Line 13 if you could go up a little bit. Maybe I have that reference wrong. I apologize. Let's go to the next page, Page 120 around Line 13.

Okay. Do you see this paragraph that starts at Line 13 with the words "consider an example"?

A The I do.

Q Let's look at that. So that paragraph says: "Consider an example in which Alice wears ear phones," and so I have to move my -- "and localize voice of Bob in front of her during a phone call. While talking to Bob, Alice gets into her car and begins to drive. The state where Alice is located, however, prohibits drivers from localizing sound while driving a motorized

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vehicle. The earphones immediately stop localizing the voice of Bob and switch the call from providing Alice with binaural sound to providing Alice with mono sound".

Do you see that?

A I do.

Q So what environment is Alice in at the beginning of this example?

A At the beginning of this example and throughout the example, Alice is in a physical environment.

Q Okay. So Alice is in a physical environment when she gets the phone call from Bob, correct?

A That's right.

Q And Alice gets into her car and begins to drive.

Do you see that?

A That's right.

Q Has Alice changed her physical environment?

A No. She's still -- she started off in the

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physical environment and she's still in the physical environment. She's in her car now.

Q How would Alice leave this physical environment?

MR. HENRY: Objection to form.

BY THE WITNESS:

A Well, to leave a physical environment, you would need to go to a different type of environment.

So, an example of how Alice might change her physical environment or leave her physical environment would be, for example, to go into a virtual environment.

BY MS. PIANA:

Q Would you leave a physical environment without going into a virtual environment?

MR. HENRY: Objection to form, ambiguous.

BY THE WITNESS:

A Your question is would you leave a physical environment if you're not going into a virtual environment?

BY MS. PIANA:

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Q Yes. I'm trying to understand how you can leave a physical environment.

A So, again, you can leave a physical environment by going to a not physical environment, such as a virtual environment.

Q Could you leave one physical environment by going to a different physical environment?

A I would call that going into a different area within the same environment, which is what I think Alice did when she went into her car.

Q So after Alice gets into her car, what happens with the audio as disclosed in this paragraph here?

A So the paragraph the says: "The state where Alice is located, however, prohibits drivers from localizing sound while driving a motorized vehicle. The ear phones immediately stop localizing the voice of Bob and switch the call from providing Alice with binaural sound to providing Alice with mono sound."

So to answer your question, the sound, so the ear phones stop localizing the voice of Bob

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1 **and switch the call from a binaural sound to a**
2 **mono sound.**
3 Q When Alice is getting the binaural audio
4 from Bob in this example, is Alice in a 3D virtual
5 environment?
6 **A She's not in a virtual -- she's not in a**
7 **3D virtual environment.**
8 Q You testified earlier that a 3D virtual
9 environment could be an environment that just has
10 3D sound.
11 Do you remember that?
12 MR. HENRY: Objection to form.
13 BY THE WITNESS:
14 **A What I said was that a virtual environment**
15 **or 3D virtual environment contains both**
16 **modalities, remember? I talked about the visual**
17 **modality and the sound modality.**
18 **BY MS. PIANA:**
19 Q I remember you saying that it could have
20 both modalities, but it didn't have to have both
21 modalities. We could go back and look at your
22 testimony if that would be helpful.

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1 **A Sure. I think the clarification that I**
2 **made is that a virtual environment would have the**
3 **visual and the sound modality. I could, of**
4 **course, close my eyes which is what I believe I**
5 **said, but the environment, the virtual environment**
6 **still contains those two modalities.**
7 Q Let's go to Page 96 of this same exhibit,
8 which is Exhibit 3. And while we're doing that,
9 if you closed your eyes, Dr. Roginska, you would
10 be in an environment that only had 3D virtual
11 sound, correct, and not 3D virtual images,
12 correct?
13 MR. HENRY: Objection to form.
14 BY THE WITNESS:
15 **A No. I mean the environment still has the**
16 **images as well as the sound. The images are still**
17 **there.**
18 **BY MS. PIANA:**
19 Q But you as a user are not experiencing or
20 perceiving those images when your eyes are shut,
21 correct?
22 **A Sure but the images are still there in the**

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1 **virtual environment.**
2 Q Let's look at -- could we go to -- we're
3 already there -- Page 96, great.
4 If you look down at the second paragraph
5 that starts around Line 11, could you read that
6 paragraph for us, please?
7 **A Sure. "By way of introduction sound**
8 localization (i.e. the act of relating attributes
9 of the sound being heard by the listener to the
10 location of an auditory event) provides the
11 listener with a three dimensional (3D) soundscape
12 or 3D sound environment where sounds can be
13 localized to points around the listener. Binaural
14 sound and some forms of stereo sound provide a
15 listener with the ability to localize sound,
16 though binaural sound generally provides a
17 listener with a superior ability to localize
18 sounds in the 3D environment".
19 Q So in your opinion as a person of skill in
20 the art, would a three-dimensional or 3D
21 soundscape be a 3D virtual environment?
22 **A Not necessarily. A 3D soundscape can be**

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1 **in the real world, in the physical world as well**
2 **as in the virtual world.**
3 Q Could a 3D, three-dimensional soundscape
4 be a 3D virtual environment?
5 **A It could be in -- sure, it could be in a**
6 **virtual environment. It could be.**
7 MS. PIANA: Let's go to another exhibit.
8 Let's go to Clement. That should be named as
9 Clement in our exhibit folder.
10 (A certain document was marked Roginska
11 Deposition Exhibit 4 for identification,
12 as of 02/27/2024.)
13 BY MS. PIANA:
14 Q Dr. Roginska, do you see the document
15 that's been labeled as Exhibit 4?
16 **A Hold on a second, I'm downloading it so I**
17 **have a local copy. Give me a second. Okay, I'm**
18 **with you.**
19 Q Let's go to Figure 3A in Clement. Okay.
20 Are you familiar with this figure,
21 Dr. Roginska?
22 **A I am.**

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1 Q Can you describe for us what is happening
2 in Figure 3A specifically with the user who is
3 labeled A in this figure?
4 **A So in Figure 3A we have a user that is --**
5 **starts off in a what appears to be a virtual**
6 **environment, walks around to the three to four and**
7 **then appears to leave that environment.**
8 Q In which point has the user left the
9 environment?
10 **A When the user crosses from point four to**
11 **point five through a boundary.**
12 Q Where is the boundary in Figure 3A?
13 **A It's at point 310 -- location 310.**
14 Q So the user A starts -- well, let me ask
15 you this and we can look at Clement if we need to
16 in more detail, but do you know what 320 is as
17 labeled in Figure 3A?
18 **A Let me just double check.**
19 **So at position 4 the user has moved closer**
20 **to the boundary of the tracking -- it's the**
21 **tracking area.**
22 Q So 320 which is that shaded region here in

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1 Figure 3A that is the tracking area in Clement; is
2 that right?
3 **A That's correct.**
4 Q What about 310, what is 310 in this
5 Figure 3A?
6 **A So I'm referring -- I cover this in my**
7 **declaration in Paragraph 76 and this is taken from**
8 **Clement, if it is confirmed at block 153, which is**
9 **in a different figure, that the user is**
10 **approaching or nearing the boundary and is about**
11 **to enter an area where the tracking device 310 may**
12 **not be able to continue to track the user's**
13 **physical movement in the space 300, a transition**
14 **profile may be implemented at block 154 based on**
15 **various factors such as, for example, the virtual**
16 **environment, the real world space, 300, in which**
17 **the virtual environment is implemented direction**
18 **and/or speed and/or acceleration associated with**
19 **the movement of the user and other such factors.**
20 Q Which paragraph was that from your
21 declaration?
22 **A It was paragraph No. 76.**

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1 Q Okay. Thank you. You've identified that
2 310 as shown here in Figure 3A is the tracking
3 device, correct?
4 **A That's correct.**
5 Q And 320 is the tracking area; is that
6 correct?
7 **A That's correct.**
8 Q Is 320 a physical environment?
9 **A Well, 320 is a tracking area within a**
10 **physical environment, yeah.**
11 Q So would 320 be a physical environment?
12 MR. HENRY: Objection to form.
13 BY THE WITNESS:
14 **A 320 would be an area, a tracking area that**
15 **is represented in a virtual environment but the**
16 **space itself, where that boundary is where -- not**
17 **the boundary but where the boundary of the**
18 **tracking area is would be in the physical space.**
19 **BY MS. PIANA:**
20 Q So is 320 a physical environment?
21 MR. HENRY: Objection to form, asked and
22 answered.

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1 BY THE WITNESS:
2 **A So 320 is, again, it's a tracking area so**
3 **it's an area within -- that is located in a space.**
4 **BY MS. PIANA:**
5 Q Is it located in a physical space?
6 **A Yeah, I suppose so, but 320 is a tracking**
7 **area and, yeah, that area would be in a space, a**
8 **physical space.**
9 Q Is 320 a tracking area in a physical
10 environment?
11 **A Well, 320 represents a tracking area, it**
12 **represents an area in a virtual space in this**
13 **figure.**
14 Q What happens with the user as the user
15 proceeds from position 4 to position 5?
16 **A So what happens from four to five is that**
17 **the -- again I will refer to my Paragraph 76, so**
18 **the user that is a location four in the virtual**
19 **space is approaching the boundary and is about to**
20 **enter an area where the tracking device 320 may**
21 **not be able to continue to track the user's**
22 **physical movement in the space 300. So there's a**

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1 **transition profile that is being initiated. So**
2 **the user moves from the tracking area, moves**
3 **outside of the tracking area.**
4 Q Okay. And then just for the record, the
5 tracking area is 320, correct?
6 **A That's right. The tracking area is 320.**
7 Q And what is 310?
8 **A So 310 is is the tracking device.**
9 Q So when the user moves from the tracking
10 area 320 outside the tracking area as in position
11 5, has the user left an environment?
12 **A So in this example, I'm reading, that**
13 **user -- the user is approaching nearing the**
14 **boundary is about to enter an area where the**
15 **tracking device 310 may not be able to continue to**
16 **track the user's physical movement in space 300.**
17 **A transition profile may be implemented and based**
18 **on various factors such as for example the virtual**
19 **environment, the real world space 300 in which the**
20 **virtual environment is implemented direction**
21 **and/or speed and/or acceleration associated with**
22 **the movement.**

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1 Q Where are you reading from, Dr. Roginska?
2 **A Again, paragraph it No. 76 in my**
3 **declaration.**
4 Q So when the user transitions from position
5 4 to position 5, has the user left an environment?
6 **A So if I go just up one paragraph to**
7 **Paragraph 75, the situation is described in detail**
8 **by Clement here so I describe it here as -- so**
9 **Clement describes that the HMD 100 may include a**
10 **sensor that detects that the user's proximity to a**
11 **boundary of tracking area 320 or that the user is**
12 **within the threshold distance of a boundary of the**
13 **tracking area 320, the tracking device 310 may not**
14 **just track the physical position and movement of**
15 **user A in the space 300 but may also detect when**
16 **the user A is within a predetermined distance or**
17 **threshold of a boundary or edge of the tracking**
18 **area 320 where the system may issue a warning or**
19 **indicator and/or may automatically initiate a**
20 **fluid or graceful transition out of the virtual**
21 **world when the user approaches the boundary and I**
22 **continue to say that as the HMD 100 and/or the**

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1 **tracking device 310 or other components of the**
2 **system determines that the user is positioned**
3 **within the preset threshold in this particular**
4 **example three feet of the boundary of the tracking**
5 **area 320 at position 3B, the system 100 may**
6 **initiate a gradual transition out of the virtual**
7 **world. At position 4 the user has moved closer to**
8 **the boundary of the tracking area 320, for**
9 **example, within one foot of the boundary as shown**
10 **it in the example and illustrated in Figure 3C,**
11 **which is just below the figure that you're**
12 **pointing to right now.**
13 **At position 4 the transition out of the**
14 **virtual world may be at least partially complete**
15 **within the transition process fully complete by**
16 **the time the user reaches position 5 and is fully**
17 **outside of the tracking area 320.**
18 Q So as the user moves from position 4 to
19 position 5, has the user left an environment?
20 **A That's correct, so the user as they're**
21 **moving from position 4 into position 5 goes**
22 **through here a process of transition but is**

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1 **transitioning from one environment to another**
2 **environment.**
3 Q What environments is the user
4 transitioning from?
5 **A The user in this case is transitioning**
6 **from a virtual environment.**
7 Q What environment is the user transitioning
8 to?
9 **A Transitioning to another environment so at**
10 **position 4, and I will quote again in**
11 **Paragraph 75, last sentence: "At position 4 the**
12 **transition out of the virtual world may be at**
13 **least partially complete within the transition**
14 **process fully complete by the time the user" --**
15 **sorry, "user reaches position 5 and is fully**
16 **outside of the tracking area."**
17 Q So what environment has the user
18 transitioned to in position 5?
19 **A It has transitioned out of the virtual**
20 **environment and into an environment that is**
21 **outside of the 320 tracking area.**
22 Q Is that environment that's outside the 320

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1 tracking area a physical environment?
2 **A It would have been obvious that that would**
3 **be a physical environment, yes.**
4 Q What about the area that is inside 320
5 tracking area; is that also a physical
6 environment?
7 MR. HENRY: Objection to form. Asked and
8 answered.
9 BY THE WITNESS:
10 **A So the 320 is a tracking area and the**
11 **tracking area that is represented as stated here**
12 **as a virtual world.**
13 **BY MS. PIANA:**
14 Q Where would a user be experiencing what's
15 described in Figure 3A?
16 MR. HENRY: Objection to form, ambiguous,
17 calls for speculation.
18 BY THE WITNESS:
19 **A Yeah, I'm not sure what you mean. Can you**
20 **be more specific, please?**
21 **BY MS. PIANA:**
22 Q Sure. So in an example, there is --

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1 Clement discusses this, there is a physical space,
2 right? So 300 is marked as a physical space in
3 Clement; is that correct?
4 **A I believe so.**
5 Q So would one example of a physical space
6 be a living room?
7 **A Sure.**
8 Q So a user could set up the tracking device
9 which is 310 in the user's living room and also
10 set up the tracking area which is 320 in a user's
11 living room; is that correct?
12 **A I suppose one could, yes.**
13 Q So as the user moves from position one to
14 position 2 to position 3, that user is changing
15 its position within the tracking area, correct?
16 **A They are changing their position within**
17 **the tracking area, yes.**
18 Q And that user is also changing their
19 position in the living room of the user, correct?
20 **A No. Here they are -- because they are in**
21 **the tracking area, they are what Clement refers to**
22 **as the virtual world.**

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1 Q As the user goes from position one to
2 position 2 to position 3, what does Clement say
3 about position 3?
4 **A Can you point me to where that is in**
5 **Clement?**
6 Q Sure. Let me pull that up. All right.
7 Let's look at column 4 around Line 49.
8 So do you see the paragraph that starts --
9 oh, great -- as shown in Figure 3A the user A
10 immersed in the virtual world may move in the real
11 world space 300.
12 Do you see that?
13 **A I do.**
14 Q Figure 3A is the figure we were just
15 reviewing with Clement, right?
16 **A That's right.**
17 Q Clement discloses starting at Line 51: At
18 positions one, two, and three the user A is
19 completely within the field of view or tracking
20 area 320 of the tracking device 310. At position
21 3 the user A is within the tracking area 320 but
22 close to a boundary of the real world space 300

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1 such as for example a wall.
2 Do you see that?
3 **A I do.**
4 Q So Clement discloses physical movement of
5 the user within the tracking area; is that
6 correct?
7 **A Yeah, I mean, Clement discloses that the**
8 **user is immersed in the virtual world and may move**
9 **in the real world space 300 and at positions one,**
10 **two, and three the user is completely within the**
11 **field of view or that tracking area 320 of the**
12 **tracking device No. 310 and at position about the**
13 **user A is within the tracking area 320 but it**
14 **close to a boundary of the real world space, the**
15 **real world space 300 such as for example a wall.**
16 Q Let's go back to Figure 3A if we could.
17 So this space 300 is a real world space,
18 correct? That's what Clement says, right?
19 **A That's right.**
20 Q And so as the user is moving in their
21 living room, which is a real world space from
22 position one to two to three, then the user is

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1 also moving within the tracked area 320, correct?
2 **A That's correct.**
3 Q On the lefthand side of Figure 3A do you
4 see how the tracked area goes up to that solid
5 line?
6 MR. HENRY: Objection to form.
7 BY THE WITNESS:
8 **A Do you mean that upper left triangle?**
9 **BY MS. PIANA:**
10 Q I mean the area just below the upper left
11 triangle, do you see where the shaded area goes to
12 this solid line here on the left?
13 **A I do.**
14 Q Maybe we can -- I don't know if we need to
15 mark it or not. We just saw from Clement that at
16 position 3, Clement says the user is getting close
17 to a wall.
18 Do you recall that?
19 **A So I have -- yes, so Clement says at**
20 **position 3 the user A is within the tracking area**
21 **320 but close to a boundary of the real world**
22 **space 300.**

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1 Q Right. And if you keep reading the rest
2 of that sentence, please, Dr. Roginska?
3 **A Yeah. But close to a boundary of the real**
4 **world space 300 such as, for example, a wall.**
5 Q So Clement discloses that this solid line
6 on the lefthand side of Figure 3A that abuts the
7 shaded area could be a wall; is that right?
8 **A That's what Clement says.**
9 Q What about the boundary -- well, and you
10 would agree, Dr. Roginska, that a wall is a
11 physical boundary, correct?
12 **A It is a physical boundary, yes.**
13 Q What about the boundary that is horizontal
14 on the bottom of Figure 3A, do you see that that
15 boundary?
16 MR. HENRY: Objection to form.
17 BY THE WITNESS:
18 **A Do you mean the one between position 4 and**
19 **five?**
20 **BY MS. PIANA:**
21 Q Yes. That's the one I mean.
22 **A I see a horizontal line, yes.**

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1 Q And would that horizontal line represent a
2 boundary of the tracked area 320?
3 **A That's what Clement says, that 320 is the**
4 **tracking area so that would indicate a boundary.**
5 Q So when the user moves from position 4 to
6 position 5, the user has crossed this boundary at
7 the bottom of Figure 3A, correct?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 **A So as the user moves -- so I will read**
11 **again from Clement from the paragraph where we**
12 **were just at a moment ago, at position 4 the user**
13 **A is just within the tracking area 320, very close**
14 **to a boundary of the tracking area 320. At**
15 **position 5 the user has crossed the boundary of**
16 **the tracking area 320 and has moved completely out**
17 **of the field of view or tracking area 320 of the**
18 **tracking device 310.**
19 **BY MS. PIANA:**
20 Q So Clement discloses that this boundary
21 here at the bottom of Figure 3A the horizontal
22 boundary that is between position 4 and position 5

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1 is a virtual boundary; is that correct?
2 **A It is a -- well, it's a boundary between**
3 **the tracking area and being -- the tracking area**
4 **320 and being outside of the tracking area 320.**
5 Q Could this boundary at the bottom of
6 Figure 3A between position 4 and position 5 be a
7 wall?
8 MR. HENRY: Objection to form, calls for
9 speculation.
10 BY THE WITNESS:
11 **A You mean like a physical wall?**
12 **BY MS. PIANA:**
13 Q Yes. I mean a physical wall.
14 **A I don't think so. Because if a person --**
15 **I mean, unless somebody can walk through walls but**
16 **a person wouldn't be able to walk from position 4**
17 **to position 5 if that horizontal line is a wall.**
18 Q So would you agree, then, that this
19 boundary at the bottom of Figure 3A between
20 position 4 and position 5 is a virtual boundary?
21 MR. HENRY: Objection to form, asked and
22 answered.

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1 BY THE WITNESS:
2 **A Yeah. I don't know if I would call it a**
3 **virtual boundary but it's a boundary.**
4 **BY MS. PIANA:**
5 Q But it's not a physical boundary, right?
6 It's not a physical wall, correct?
7 **A It's not a physical wall.**
8 Q How does Clement disclose determining the
9 position of the user while the user is in the
10 tracked area 320?
11 **A So I covered that in my declaration. If**
12 **we go to in my declaration at Paragraph 75, thank**
13 **you. So in that paragraph I say: Clement**
14 **describes that the HMD 100 may include a sensor**
15 **that detects that the user user's proximity to a**
16 **boundary of the tracking area 320 or that the user**
17 **is within a threshold distance of a boundary of**
18 **the tracking area 320. The tracking device 310**
19 **may not just track the physical position and the**
20 **movement of the user A in the space 300 but may**
21 **also detect when the user A is within a**
22 **predetermined distance or threshold of a boundary**

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1 **or edge of the tracking area 320.**
2 **But I think the most relevant component**
3 **here to answer your question is that Clement**
4 **describes that the HMD 100 may include a sensor**
5 **that detects that the user's proximity to a**
6 **boundary of the tracking area 320.**
7 Q What kind of sensors does Clement
8 disclose?
9 **A Clement -- just give me one second.**
10 MR. HENRY: Counsel, if you could look for
11 an opportunity to take a quick break soon that
12 would be appreciated.
13 MS. PIANA: Sure, let me just finish this
14 line of questioning and then we'll take a break.
15 BY THE WITNESS:
16 **A So if we go to Clement, column 4, starting**
17 **at Line 15, please. Thank you I will so I'll read**
18 **in some embodiments this type of motion tracking**
19 **in the space may be accomplished by for example a**
20 **tracking device such as a camera positioned in the**
21 **space and in communication with a base station**
22 **generating the virtual world in which the user is**

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1 **immersed. This base station may be, for example,**
2 **a standalone computing device or a computing**
3 **device included in the HMD worn by the user.**
4 **BY MS. PIANA:**
5 Q So my question was what kind of sensors
6 does Clement disclose using?
7 **A Here he discloses -- I want to make sure I**
8 **understand your question, by sensors do you mean**
9 **for the purpose of the tracking?**
10 Q Yes.
11 **A We just read and it's shown here that the**
12 **kind of sensors for motion tracking maybe it says,**
13 **for example, a camera positioned in the space in**
14 **communication with base stations or it also may be**
15 **a computing device included in the HMD worn by the**
16 **user.**
17 Q Okay. So Clement says that the tracking
18 device might be a camera that's positioned in the
19 space and in communication with a base station,
20 correct?
21 MR. HENRY: Objection to form.
22 BY THE WITNESS:

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1 **A That's what it says here in this**
2 **paragraph, yes.**
3 **BY MS. PIANA:**
4 Q And then it says that the base station,
5 which is different than the camera, the base
6 station may be a standalone computing device or a
7 computing device included in the HMD worn by the
8 user, correct?
9 **A That's correct.**
10 Q And then it goes on to say: In the
11 example implementation shown it in Figure 3A,
12 that's the figure we were just looking at a
13 tracking device 310 such as, for example, a camera
14 310 is positioned in a physical real world space
15 300.
16 Do you see that?
17 **A I do.**
18 Q So Clement discloses that this tracking
19 device 310 is separate from the HMD worn by the
20 user, correct?
21 MR. HENRY: Objection to form.
22 BY THE WITNESS:

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1 **A Well, in that particular case, yes, but**
2 **there are other places in Clement that give**
3 **another example and just give me a moment to find**
4 **that.**
5 **BY MS. PIANA:**
6 Q Okay?
7 **A Another example I would like to point to**
8 **is also in Clement, column 6, around Line 27.**
9 **Thank you. I will read starting at Line 23.**
10 **As shown in Figure 3 C the user is**
11 **completely within the tracking area 320 at**
12 **position 3A. As the user moves from position 3A**
13 **to position 3B, the user approaches the point at**
14 **position 3B at which the edge of the established**
15 **three-foot radial zone meets the boundary of the**
16 **tracking area 320. As the HMD 100 and/or the**
17 **tracking device 310 or other component of the**
18 **system determines that the user is positioned**
19 **within the preset threshold, this particular**
20 **example three feet of the boundary of the tracking**
21 **area 320 as at position 3B, the system 100 may**
22 **initiate a gradual transition out of the virtual**

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1 **world.**
2 **So here it clearly at Line 27 to 28 says**
3 **as the HMD 100 and/or the tracking device 310 or**
4 **other component of the system determines that the**
5 **user is positioned within the preset threshold.**
6 **So here is an example of how the HMD**
7 **and/or the tracking device is the device that**
8 **determines the position of the user.**
9 Q So let's go to Clement Column 11. And
10 specifically around lines 52 to 57. So if you
11 see, Dr. Roginska, at Line 52, do you see where it
12 starts: "For example"?
13 **A I see that.**
14 Q So Clement discloses: "For example in
15 some embodiments a brightness level in the space
16 300", and that's the real world space, right, 300,
17 yes?
18 **A Yes.**
19 Q "May be sensed by a light sensor 162 of
20 the sensing system 160 or by a light sensor
21 included in the camera 180 and a sound level in
22 the space 300 may be sensed by an audio sensor 164

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1 of the sensing system 160 or by a microphone
2 included in the camera 180."
3 So this part of Clement that I just read
4 discloses several different types of sensors,
5 correct?
6 **A Yes, it does.**
7 Q So there's a light sensor 162, there's a
8 camera that may include a light sensor at 180, and
9 there is a microphone included in the camera at
10 180, there's also an audio sensor disclosed here,
11 right?
12 **A Yeah, I see that.**
13 Q So how could these types of sensors that
14 have been listed here in Clement determine when
15 the user is leaving the tracked area and not
16 encountering a physical wall?
17 **A I'm sorry. Are you asking me how these**
18 **particular sensors detect the --**
19 Q Yes?
20 **A Location of -- there are a number of**
21 **different sensors listed here, optical light**
22 **sensors, sound sensors, camera sensors, all of**

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1 **those sensors work in different ways, can work in**
2 **different ways to determine the position, the**
3 **location of a user, for example.**
4 Q So how would a light sensor determine the
5 position of the user in the tracked area 320?
6 **A So is your question -- are you asking me**
7 **how a light sensor works?**
8 Q I'm asking how would a light sensor
9 determine the location of a user inside the
10 tracked area?
11 **A I mean, a light sensor could be -- there**
12 **might be, I don't know, a light on the user who's**
13 **walking there and there's a light sensor that**
14 **detects a light on the user, that might be an**
15 **example of how a light sensor might do that.**
16 Q Would those light sensors be on the HMD?
17 **A I don't know. They could be.**
18 Q So if the HMD -- sorry. Strike that.
19 If the user has a light and the user is
20 also wearing the HMD, how could a light sensor on
21 the HMD detect the location of the user inside the
22 tracked area?

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1 **A I want to make sure I understand.**
2 **So in this situation, this hypothetical**
3 **situation, you're saying that a user is wearing an**
4 **HMD and there's a light on the HMD and a light**
5 **sensor is detecting the location -- you're asking**
6 **me how does that light sensor sense the location**
7 **of the user?**
8 Q Yes.
9 **A Maybe if we look at this particular**
10 **situation with, you know, the light sensor and all**
11 **that, let me just go to the claim.**
12 **So I guess we're looking at Figure 1A; is**
13 **that right?**
14 Q Yes, let's go to Figure 1A.
15 **A Okay. Great. Thank you. All right. So**
16 **let's go through this.**
17 Q So Figure 1A shows the HMD 100, correct?
18 **A That's correct.**
19 Q And so Figure 1A also discloses other
20 parts of the HMD, correct?
21 **A Yes, it appears to, uh-huh.**
22 Q So the sensors that we just discussed in

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1 Column 11, those are all sensors that are present
2 on this illustration of the HMD in Figure 1A,
3 correct?
4 **A Yes, that's correct.**
5 Q So, sorry, Dr. Roginska, so we've got the
6 light sensor -- excuse me -- 162 and you can see
7 where that is on the HMD?
8 **A Yes.**
9 Q And then the -- let's see the camera 180
10 you can see where that is on the HMD?
11 **A Yes.**
12 Q Is it the audio sensor 164, that's also on
13 the HMD, correct?
14 **A Correct.**
15 Q Okay. So these sensors, again, are
16 present on the HMD and my question is how could
17 the system in Clement determine the location of
18 the user with these sensors?
19 MR. HENRY: Objection to form.
20 BY THE WITNESS:
21 **A Well, that particular -- hold on, let me**
22 **just make sure I'm giving you a complete answer.**

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1 **Actually Clement describes this just a**
2 **little bit lower in that paragraph that we were**
3 **on, and, I'm sorry, it's Column 11 around**
4 **Line 50 -- is that 57? And it states, I will**
5 **read: When transition is to be initiated the**
6 **brightness level and the sound level of the real**
7 **world space 300 sensed by the sensing system may**
8 **be compared to the brightness level and the sound**
9 **level of the virtual world by the processor 190**
10 **and the transition process, for example, the**
11 **transition profile may be selected/established**
12 **taking into account the degree of difference**
13 **between these environmental factors in the virtual**
14 **world and the real world.**
15 Q So as a person of ordinary skill in the
16 art, what is that saying to you in terms of how
17 the sensor is located on the HMD can determine the
18 position of the user in the tracked area?
19 **A Well, to be honest with you, the mechanics**
20 **of how the HMD and how the sensors figure out**
21 **where a person is located is not as important as**
22 **the fact that the HMD is determining the location**

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1 **of the user. I'll tell you why. Because for a**
2 **person of ordinary skill, it would have been**
3 **obvious that an HMD -- based on Clement's**
4 **description a HMD can locate and track a user**
5 **within the space.**
6 Q How would an HMD locate and track a user
7 in the space?
8 **A I mean, as an example, it is described**
9 **here the paragraph that we just read. In this**
10 **case it might be using optical sensors or audio**
11 **sensors, there are gyroscopes, there is all sorts**
12 **of different kinds of sensors that might be**
13 **integrated into an HMD.**
14 Q Right. But Clement says that these are
15 the types of sensors that could be present in the
16 HMD, correct?
17 **A Clement says -- he says in some**
18 **embodiments, you know, this is an example, but I**
19 **think Clement's more important point is that the**
20 **HMD can determine the location of a user and can**
21 **track the user.**
22 Q So how does Clement disclose the HMD

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1 determining the location of the user at position 4
2 versus the location of the user at position 5?
3 **A How does Clement's HMD, his specific HMD?**
4 Q Yes.
5 **A Well, he talks about comparing the -- in**
6 **that paragraph that I just read, he said that the**
7 **brightness level and the sound level of the real**
8 **world space 300 sensed by the sensing system may**
9 **be compared to the brightness level and sound**
10 **level of the virtual world by the processor,**
11 **et cetera, et cetera. So he gives an example of**
12 **how he might do this. But, again, I think that**
13 **the more important lesson that Clement teaches and**
14 **that he teaches through this patent is that the**
15 **HMD has the capability of locating a user and**
16 **tracking a user.**
17 Q For the HMD to have the ability to locate
18 the user and track the user, does the HMD need an
19 external reference point?
20 MR. HENRY: Objection to form, ambiguous.
21 BY THE WITNESS:
22 **A It might. I'm not -- I'm not sure.**

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1 **BY MS. PIANA:**
2 Q Would you consider yourself, Dr. Roginska,
3 to be an expert in the virtual reality game space?
4 MR. HENRY: Objection to form.
5 BY THE WITNESS:
6 **A That's a huge space. I do consider myself**
7 **to be an expert with a lot of experience in the**
8 **virtual reality/augmented reality and gaming**
9 **space, but which particular area of that space are**
10 **you referring to? Am I an expert in building**
11 **HMDs, the hardware? Probably not.**
12 **BY MS. PIANA:**
13 Q What about determining location in a
14 physical environment? Are you an expert in
15 different ways to determine location in a physical
16 environment?
17 **A I would consider myself an expert in**
18 **determining the location in a physical**
19 **environment, yes.**
20 Q Let's go to Clement at Column 1, 31
21 through 42.
22 **A And after this question could we please**

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1 **take a break.**
2 Q Yes. Thank you for reminding me. Okay.
3 Do you see around Line 31 it starts with.
4 "In another aspect"? Do you see that?
5 **A I see that.**
6 Q So Clement discloses here at Column 1,
7 lines 31: In another aspect, a method of
8 operating an audiovisual system configured to
9 generate a virtual immersive experience may
10 include, so Clement is laying out what this method
11 may include, activated a tracking device, having a
12 defined tracking area and tracking movement of a
13 user, I think maybe -- tracking movement of a user
14 electronic device in the real world space, I feel
15 there's a word missing there, as a person of skill
16 in the art, what is your understanding of a
17 tracking device?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 **A This to me means method of operating an**
21 **audiovisual system configured to generate a**
22 **virtual immersive experience includes activating a**

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1 **track device having a defined tracking area and**
2 **tracking movement of a user's electronic device in**
3 **the real world space so to me that means that I'm**
4 **activating, have a tracking area and I have a**
5 **tracking device in that area and I will have an**
6 **electronic device, I will track the movement of an**
7 **electronic device, of a user's electronic device.**
8 Q So we looked at the tracking device in
9 Figure 3A.
10 Do you remember that?
11 **A It wasn't the tracking -- it was the**
12 **movement of a user in Figure 3A, correct.**
13 Q Let's go to Figure 3A. So we were looking
14 at the movement of a user but do you remember that
15 310 was the tracking device?
16 **A Yes.**
17 Q And 310 the tracking device is definitely
18 separate from the HMD worn by the user.
19 Do you agree with that?
20 MR. HENRY: Objection to form.
21 BY THE WITNESS:
22 **A In that figure the HMD was not worn by the**

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1 **user, that's right.**
2 **BY MS. PIANA:**
3 Q Let's go back to Clement. Let's look
4 at -- let's look at column 4, Line 15. Do you see
5 the paragraph that starts in some embodiments,
6 this type of motion it tracking in this space may
7 be accomplished by, for example, a tracking device
8 such as a camera positioned in the space, do you
9 see that?
10 **A Yes, I believe we read that part before as**
11 **well.**
12 Q And so that portion of Clement discloses
13 the tracking device illustrated as 310 in
14 Figure 3A could be a camera, correct?
15 **A It could be, uh-huh.**
16 Q And that tracking device, again, is
17 separate from the HMD, correct?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 **A In that particular embodiment as Clement**
21 **says in some embodiments this type of motion**
22 **tracking could be accomplished by what you are**

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1 **reading, yes.**
2 **BY MS. PIANA:**
3 Q Let's go now to 49 through 53, same
4 column, column 4. And I think we already looked
5 at this as well but starting at Line 49, it says:
6 As shown in Figure 3A, the user A, immersed in the
7 virtual world, may move in the real world space
8 300, for example, sequentially from position 1 to
9 position 5.
10 Do you recall that, Dr. Roginska?
11 **A I do.**
12 MR. HENRY: Counsel, it's been an hour and
13 a half now and we both requested a break so why
14 don't we go off the record and you can continue
15 your questioning once we get back.
16 MS. PIANA: One more question.
17 MR. HENRY: One more question?
18 MS. PIANA: Yes.
19 BY MS. PIANA:
20 Q At Line 53, do you see that Clement says
21 of the tracking device 310?
22 **A I see those words written there, yes.**

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1 MS. PIANA: Good to my word, I will pause
2 there and we will take a break.
3 THE VIDEOGRAPHER: We are going off the
4 record at 3:34 p.m. Central time.
5 (A recess was had.)
6 THE VIDEOGRAPHER: We are going back on
7 the record at 3:48 p.m. Central time.
8 BY MS. PIANA:
9 Q Dr. Roginska, do you recall before the
10 break we were looking at Clement and specifically
11 column 4, right around Line 53 and you'd
12 acknowledged that Clement discloses at that column
13 and line the tracking device 310?
14 **A I see the words written tracking device**
15 **310, yes.**
16 Q So I show in Figure 3A Clement discloses
17 using this tracking device 310 to define the
18 tracking area 320 and also determine the user's
19 location within the tracking area 320; is that
20 correct?
21 MR. HENRY: Objection. Form, compound.
22 BY THE WITNESS:

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1 **A At Clement Figure 3A, that's what the**
2 **figure -- the figure shows the tracking area 320**
3 **with a tracking device 310.**
4 **BY MS. PIANA:**
5 Q How does Clement disclose determining the
6 user's position within the tracking area 320?
7 MR. HENRY: Objection to form.
8 BY THE WITNESS:
9 **A Well, let's take a look.**
10 **So for that particular example, that**
11 **embodiment Figure 3A, Clement talks about in just**
12 **the paragraph above where you were showing so**
13 **column 4 starting at Line 15, in a whole paragraph**
14 **describes how this might be done. Would you like**
15 **me to read the paragraph?**
16 Q No, thanks. You don't have to read the
17 paragraph. But maybe looking at that paragraph
18 you can answer my last question which is how does
19 Clement determine in the disclosure discussing
20 Figure 3A the position of the user within the
21 tracking area 320?
22 MR. HENRY: Objection to form.

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1 BY THE WITNESS:
2 **A So the location of the user, again,**
3 **Clement says starting at line around 29, in this**
4 **example, the tracking area 320 of the tracking**
5 **device 310 is smaller than the real world space**
6 **300 in which the system is received. As a user A,**
7 **immersed in the virtual world moves through the**
8 **real world space 300, a position of the user A in**
9 **the space 300 may be tracked by the tracking**
10 **device 310 and translated into a position movement**
11 **in the virtual world provided the user A remains**
12 **within the field of view or tracking area 320 or**
13 **tracking device 310. In this example the tracking**
14 **area at 320 is smaller than the real world space**
15 **300, it is possible for the user A to move out of**
16 **the tracking area 320 and still be in the space**
17 **300. The user if the user A moves out of the**
18 **tracking area 320 or for some other reason cannot**
19 **be seen by the tracking device 310, such as for**
20 **example being blocked by an obstacle and continued**
21 **movement of the user A in the real world space 320**
22 **will not be translated into corresponding movement**

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1 **in the virtual world, rather after tracking is**
2 **lost while the user A continues to move in the**
3 **real world space 300, the virtual world will**
4 **remain still or appear to be stuck.**
5 **So in this particular case the tracking**
6 **device 310 appears to be some sort of an**
7 **optical-based tracking device.**
8 Q It's the tracking device 310 that
9 determines the position of the user A, correct?
10 I'll direct you to about Line 33 to 35?
11 **A In this particular case, that's correct,**
12 **but in Clement, Clement states that as I pointed**
13 **to you before that the tracking device may be a**
14 **HMD, right, or a tracking device.**
15 Q I understand. Let's go to Clement
16 Column 5, line 41 in the paragraph that starts as
17 noted above, so do you see that?
18 **A I do.**
19 Q And this disclosure in Clement is still
20 discussing Figure 3A which we already established
21 uses the tracking device 310, but I just wanted to
22 point out that it's still talking about using the

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1 tracking device 310, so do you see the sentence
2 that says: As noted above while at position 4,
3 the tracking device 310 may still track movement
4 of the user A in the space 300.
5 Do you see that?
6 MR. HENRY: Objection to form, compound.
7 BY THE WITNESS:
8 **A I see that sentence you just read, yes.**
9 **BY MS. PIANA:**
10 Q In that sentence I just read, Clement is
11 disclosing using the tracking device 310 to
12 determine the position of the user inside the
13 tracking area, correct?
14 **A That's correct.**
15 Q And last part of this discussion on
16 Figure 3A, just a few lines down at Line 55, the
17 paragraph starting in some embodiments, do you see
18 that, Dr. Roginska?
19 **A Yes, at Line 55 I do, yes.**
20 Q So at Line 55, it says -- at Line 55
21 Clement discloses in some embodiments the tracking
22 device 310 may not just track the physical

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1 position and movement of the user A in the space
2 300 but may also detect when the user A is within
3 a predetermined distance or threshold of a
4 boundary or edge of the tracking area 320, at
5 which loss of tracking may be I am meant.
6 Do you see that?
7 **A I see that, yes.**
8 Q So, again, when discussing Figure 3A,
9 Clement discloses using the tracking device 310 to
10 determine the user's position within the tracking
11 area, correct?
12 **A That's correct.**
13 Q Are there any places in Clement that
14 disclose using only the HMD to track the user's
15 position in the tracked area?
16 **A Yes, and I believe I pointed you to one**
17 **earlier but let me find that or another example.**
18 **Just give me one minute.**
19 **Another example, I can't remember if it's**
20 **the same one I pointed to you before but maybe**
21 **it's a different one because I know there's a**
22 **couple of places in the patent but let's look at**

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1 **column 6, line -- around Line 27. And I just want**
2 **to zoom into the sentence that is very important**
3 **and I know this is still related to Figure 3, in**
4 **this particular example talking about 3C, it says:**
5 **"As the HMD 100 and/or the tracking device 310 or**
6 **other component of the system determines that the**
7 **user is positioned within the preset threshold, in**
8 **this particular example three feet of the boundary**
9 **of the tracking area 320, at position 3B, the**
10 **system 100 may initiate a gradual transition out**
11 **of the virtual world."**
12 **What's important here is the first part of**
13 **the sentence I just read which are states as the**
14 **HMD 100, which is the HMD that we looked at,**
15 **and/or the tracking device 310 and this indicates**
16 **that the tracking of the user's position could be**
17 **done by the HMD and/or the tracking device 310.**
18 Q All of those other examples that we just
19 went through regarding Figure 3, Clement disclosed
20 using the tracking device 310 to track the user's
21 position, correct?
22 MR. HENRY: Objection to form.

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1 BY THE WITNESS:
2 **A In the other examples that we read, he**
3 **focused on tracking device 310, but here he**
4 **clearly says that the tracking could have been**
5 **done either by the tracking device 310 or the HMD**
6 **100.**
7 **BY MS. PIANA:**
8 Q How does Clement disclose using the HMD to
9 determine the user's position within the tracking
10 area?
11 **A Well, Clement discloses that the HMD can**
12 **be used to determine the location --**
13 Q I understand -- I'm sorry.
14 MR. HENRY: Go ahead.
15 BY MS. PIANA:
16 Q I'm sorry.
17 **A I was going to say that Clement discloses**
18 **that the HMD can be used to determine the**
19 **location.**
20 Q But does Clement disclose how the HMD can
21 be used to determine the user's location?
22 **A Do you mean how the technology within the**

219

1 **HMD works?**
2 Q Yes. Specifically how does the technology
3 within the HMD work to determine the user's
4 location?
5 **A Yeah, but I mean he doesn't disclose how**
6 **the tracking device 310 works specifically. Go**
7 **ahead.**
8 Q Sorry. That's not my question.
9 My question is does Clement disclose how
10 the HMD works to determine the user's location?
11 **A Let me check.**
12 **So Clement does say that the -- I'm sorry,**
13 **I'm looking at Column 3, starting at line about**
14 **20, talks about the HMD 100 and all the sensing**
15 **system that it has.**
16 Q So there at Column 3, Line 20, Clement
17 discloses: The HMD 100 may also include a sensing
18 system 160 including various sensing system
19 devices 162-164 and a control system 170 including
20 various control system devices 171-176 to
21 facilitate manual user control and automated
22 control of the HMD 100.

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1 Is that what you were referring to,
2 Dr. Roginska?
3 **A Yeah, that's right, and he goes on to**
4 **talking about in some embodiments the HMD 100 may**
5 **also include a camera, which may capture the**
6 **physical images, et cetera, et cetera and he also**
7 **then refers to in the following paragraph starting**
8 **at Line 42, there's a block diagram of a system**
9 **200 for transitioning from a virtual augmented**
10 **reality environment to an ambient environment**
11 **shown in Figure 2 and the system 200 may include a**
12 **user electronic device such as a HMD and described**
13 **above to generate the virtual environment system**
14 **in communication with a tracking system that**
15 **tracks a user position in the real world, physical**
16 **space so that the user's physical movement in the**
17 **real world space may be translated into movement**
18 **in the virtual reality world by the system 200.**
19 **So he talks about the HMD working in**
20 **combination with a tracking device to track the**
21 **user's position.**
22 Q Does Clement disclose how the HMD by

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1 itself can determine a user's position in the
2 tracked area 320?
3 MR. HENRY: Objection to form, asked and
4 answered.
5 BY THE WITNESS:
6 A Clement discloses that the tracking may be
7 done by a tracking device and/or the HMD 100 as we
8 went through the example a few minutes ago.
9 BY MS. PIANA:
10 Q Is that the most level of detail that
11 Clement discloses regarding how the HMD can be
12 used by itself to determine a user's position in
13 the tracking area 320?
14 MR. HENRY: Objection to form, ambiguous.
15 BY THE WITNESS:
16 A So Clement lists in a few locations and I
17 pointed to one, I can probably find others that I
18 know I found before, that the tracking can be done
19 by the HMD. He lists this in a number of
20 locations. He says that the tracking can be done
21 by the tracking device and/or the HMD so, I mean,
22 so it's obvious that Clement disclosed here that

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1 the tracking can be done by the HMD.
2 BY MS. PIANA:
3 Q And the tracking device that you just
4 mentioned, that's tracking device 310 which is
5 different from the HMD, correct?
6 MR. HENRY: Objection to form,
7 mischaracterizes testimony.
8 BY THE WITNESS:
9 A So what I said and again just going back
10 to column 6, I have not memorized it, okay,
11 Line 27, Clement says: "Clearly as the HMD and/or
12 the tracking device 310 or other component of the
13 system determines that the user is positioned
14 within the preset threshold," et cetera,
15 et cetera.
16 So Clement here clearly articulates that
17 the tracking can be done by the HMD or tracking
18 device 310 or he even says or other component of
19 the system.
20 BY MS. PIANA:
21 Q Let's go to Column 11, Line 57. So we
22 looked at this before, Dr. Roginska, in terms of

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1 the various sensors that could be included in the
2 HMD.
3 Do you recall that?
4 A Yes.
5 Q And Clement discloses that there could be
6 a camera 180 or there could be an audio sensor 164
7 as examples of the type of sensors that could be
8 in the HMD, correct?
9 A Sure.
10 Q How would a camera on the HMD know when
11 the user has left the tracking area 320?
12 MR. HENRY: Objection to form.
13 BY THE WITNESS:
14 A Are you asking specifically how the camera
15 180 would determine the location of the user?
16 BY MS. PIANA:
17 Q Sure. Let's start with that question.
18 How would the camera 180 which is on the
19 HMD determine the location of the user inside the
20 tracking area?
21 A Well, what Clement says here, gives an
22 example, for example, in some embodiments a

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1 brightness level in the space 300 may be sensed by
2 a light sensor 162 of the sensing system 160 or by
3 a light sensor included in the camera 180 and a
4 sound level in the space 300 may be sensed by an
5 audio sensor 164 of the sensing system 160 or by a
6 microphone included in the camera.
7 So he talks about as an example, right, he
8 gives here an example of how this might work.
9 Q Let's go back to Figure 3A, please.
10 A Yes.
11 Q So if there is a camera on the WED --
12 strike that.
13 If there is camera on the HMD on the
14 display and the user is moving from position 4 to
15 position 5, how would the camera know that the
16 eyes user has crossed that boundary at the bottom
17 of Figure 3A the horizontal boundary that we
18 previously established is not a physical wall?
19 A I think that the important thing here is
20 Clement describes an example of -- let me
21 rephrase. Let me start over.
22 Clement describes in multiple parts in

225

1 his -- in the document that the tracking can be
2 done, yes, by the tracking device 310, but he also
3 says that the tracking can be done by the HMD or
4 it another component of the system. And the
5 specific way of how this is done is maybe
6 secondary to this but what is important and what a
7 POSA would have focused on is that, okay, I have a
8 HMD, Clement disclosed that, I can track the
9 user's location by the HMD or in this case an
10 external tracking device but I can also do it on
11 the HMD.
12 Q Would a POSA know how to track a user's
13 position using a camera on the HMD when a user is
14 transitioning from position 4 to position 5?
15 A I can certainly think of, but I'm
16 speculating here so the tracker on the HMD with
17 the components that it has might figure out a way
18 how to determine the location based on the
19 relative location where it has started, right, so
20 you can -- as an example and this is not in
21 Clement, you can determine -- create a boundary
22 area and normalize your location to some location

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1 within that boundary and use your relative
2 location by moving through that space, and that's
3 an example of how a POSA who thought you know
4 what, I can do this just through HMD, but, again,
5 the important idea that Clement set here is that
6 the tracking itself can be done by the HMD, and I
7 would like to just as I have the Clement up here,
8 I'd like to move your attention to column 12,
9 Line 20, here is another example where Clement
10 says: "In the absence of a specific command to
11 transition from the virtual world the HMD 100
12 and/or the tracking device 310 may determine a
13 current position of the user in the tracking area
14 320."
15 So here is another example of Clement
16 clearly states the HMD 100 and/or the tracking
17 device 310 may determine the current position of
18 the user.
19 Q I understand that Clement discloses that,
20 but Clement does not disclose how to determine
21 current position of the user using just the HMD,
22 correct?

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1 MR. HENRY: Objection to form.
2 BY THE WITNESS:
3 A How specifically the technology works
4 within all the components in the HMD, that
5 specific description I don't think is here,
6 however, again, I want to underline the important
7 factor, that it is the -- he states that the HMD
8 can be used by itself as a tracking mechanism to
9 track the location of the user.
10 BY MS. PIANA:
11 Q You mentioned earlier determining relative
12 positioning, do you recall that?
13 A Just a few moments ago?
14 Q Yes.
15 A Yes.
16 Q And you also mentioned that you consider
17 yourself an expert in determining the physical
18 location in a VR environment; is that right?
19 A I have worked with a lot of different
20 tracking technologies and equipment of various
21 types so I have a lot of experience with tracking
22 technologies, yes.

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1 Q How does determining relative positioning
2 work? What does relative positioning mean?
3 MR. HENRY: Objection to form.
4 BY THE WITNESS:
5 A Well, the example I gave before was just
6 an example -- a hypothetical example that one
7 could do it. And one could do it with in probably
8 various ways. As I said also before, would I be
9 building a tracker for you, no, that's not my
10 expertise. My expertise is in the field of
11 spacial audio. I have a lot of experience working
12 with tracking mechanisms because of that. So the
13 example that I gave was, yes, one could use for
14 example a relative location, not necessarily that
15 you would but, again, in this case I think what is
16 important in Clement is that he identifies that
17 the HMD, that the tracking or the tracking the
18 location of a user could be done either with a
19 tracking device which is an external device such
20 as the 310 or it could be done with the HMD 100.
21 BY MS. PIANA:
22 Q Does relative positioning require an

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1 external device such as the tracking device 310?
2 **A Here we are talking a hypothetical outside**
3 **of Clement, you're talking just a general question**
4 **whether any relative tracking device requires an**
5 **outside system?**
6 Q Yes.
7 **A So, no, relative tracking devices such as**
8 **ones using a gyroscope don't need to have an**
9 **external device. They could be self sufficient**
10 **let's call it.**
11 Q What about if you were using a camera to
12 track position, would you need an external
13 reference point?
14 **A If you are using a camera to track the**
15 **location of an object, most systems have a camera**
16 **that is an external camera, yes.**
17 Q So back at Figure 3A, how would a camera
18 on the HMD determine when the user crosses that
19 boundary from position 4 to position 5?
20 MR. HENRY: Objection to form, asked and
21 answered.
22 BY THE WITNESS:

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1 **A I think Clement describes that in when**
2 **he's describing all the components and the -- you**
3 **read is earlier so nicely.**
4 **I believe that description is in Clement**
5 **column 4, that passage that we read earlier**
6 **starting at Line 15 that starts with in some**
7 **embodiments this type of motion tracking in the**
8 **space may be accomplished, for example, a tracking**
9 **device such as a camera positioned in the space**
10 **and in communication with a base station**
11 **generating the virtual world in which the user is**
12 **immersed. And he goes on to describe how that**
13 **device 310, so Figure 3A a tracking device 310**
14 **such as for example a camera 310 as positioned in**
15 **a physical real world space and is oriented to**
16 **capture a large portion of the space 300 as**
17 **possible with its field of view.**
18 Q Right. But that camera referred to in
19 column 4 is not on the HMD, correct?
20 **A That camera that we just read about, that**
21 **is -- for example, a camera 310, yeah.**
22 Q And we had previously established that 310

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1 in Figure 3A is the tracking device which is not
2 the same as the HMD, correct?
3 MR. HENRY: Objection to form,
4 mischaracterizes testimony.
5 BY THE WITNESS:
6 **A What we said was the HMD -- I'm sorry**
7 **tracking the user's position can be done by the**
8 **tracking device, for example, 310, but can also be**
9 **done by the HMD.**
10 **BY MS. PIANA:**
11 Q Let's go to Column 11. I just want to
12 clarify one more point here. Down at Line 57 or
13 so, so we'd just been looking at this and the
14 lines above this section of Clement disclose the
15 various sensors that may be included on the HMD.
16 Do you recall that?
17 MR. HENRY: Objection to form.
18 BY THE WITNESS:
19 **A I recall, yeah, us reading through the**
20 **different sensors that may be included on the HMD.**
21 **BY MS. PIANA:**
22 Q All right. And when I'd asked you how

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1 Clement discloses using these sensors on the HMD
2 to determine the user's position in the tracking
3 area, you pointed me to this next sentence in
4 Clement that starts. "When the transition is to
5 be initiated", do you recall that?
6 **A Vaguely.**
7 Q This sentence in Clement, however, does
8 not disclose determining the user's position in
9 the tracking area, instead it discloses this
10 transition that the user experiences from leaving
11 the virtual environment; is that correct?
12 MR. HENRY: Objection to form.
13 BY THE WITNESS:
14 **A So this states that when transition is to**
15 **be initiated, the brightness level and the sound**
16 **level of the real world space 300 sensed by the**
17 **sensing system may be compared to the brightness**
18 **level and sound level of the virtual world by the**
19 **processor 190 and the transition process, for**
20 **example, the transition profile may be selected,**
21 **established, taking into account the degree of**
22 **difference between these environmental factors in**

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1 the virtual world and the real world.
2 BY MS. PIANA:
3 Q Is that passage that you just read,
4 Dr. Roginska, say anything about how to determine
5 the user's location within the tracking area?
6 A This passage specifically talks about the
7 transition and how the transition is done, how it
8 is initiated and how it may be performed when
9 transitioning from the virtual world into the real
10 world.
11 Q So this passage that you just read does
12 not disclose how to determine a user's location
13 within the tracking area; is that correct?
14 A This particular passage that I read talks
15 about transition, does not talk about the --
16 locating -- determining the user's location,
17 position.
18 Q Let's go back to the claims of the '179
19 patent, please, so that was Exhibit 2. And
20 specifically I'd like to go to limitation 1E and
21 we'll also talk about 7E and we'll also talk about
22 14E so let's start with 1E. So limitation 1E of

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1 the '179 patent requires warning the user that the
2 user is leaving the 3D virtual environment by
3 filtering by the DSP the binaural sound to alter
4 the audio cues and it goes on. I won't spend a
5 lot of time reading it. We've spent a lot of time
6 on this limitation.
7 So 1E, the beginning of 1E requires
8 warning the user that the user is leaving the 3D
9 virtual environment, let's go now to 7E, please.
10 7E requires alerting the user that the
11 user is leaving the environment by altering the
12 processing of the binaural sound to degrade audio
13 cues in order to prevent the user from
14 experiencing external localization of the binaural
15 sound and we had talked earlier about the
16 difference between the word degrade -- the phrase
17 degrade audio cues in order to prevent the user
18 from experiencing external localization of the
19 binaural sound thus the phrase that's used in 7E
20 and the phrase that's used in 1E which is alter
21 audio cues to prevent the user from experiencing
22 external localization of the sounds and, of

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1 course, 1E as we've already established also
2 requires lowering the volume of the sounds.
3 So my question Dr. Roginska, is 1E
4 requires warning the user, 7E requires alerting
5 the user. As a POSA do those terms warning and
6 alerting mean different things to you?
7 MR. HENRY: Objection to form. Could you
8 break that up, Counsel? That was a whole page
9 and-a-half of a question.
10 MS. PIANA: Sure. I'm happy to.
11 BY MS. PIANA:
12 Q So 1E says warning the user, correct?
13 A Yes.
14 Q 7E says alerting the user, correct?
15 A Yes.
16 Q As a POSA, do those two phrases mean
17 something different?
18 MR. HENRY: Objection to form.
19 BY THE WITNESS:
20 A Well, a POSA would know that the word
21 alert and warn have slightly different meanings,
22 but that it would have been obvious that both

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1 alerting and warning means indicating to the user
2 that the user is leaving the environment.
3 Q What about the second part of 7E, by
4 altering processing of the binaural sound, is that
5 something different than filtering by the DSP the
6 binaural sound to alter audio cues?
7 A So I think we talked a lot about that
8 earlier, right, filtering by the DSP the binaural
9 sound, we talked about that, we would filter with
10 the DSP the binaural sound to alter, so to change
11 the cues to prevent the user from experiencing
12 this external localization.
13 And 7E states that altering processing of
14 the binaural sound to degrade the audio cues in
15 order to prevent the user from experiencing
16 external localization of the binaural sound.
17 Q So is filtering by the DSP different than
18 altering processing?
19 MR. HENRY: Objection to form.
20 BY THE WITNESS:
21 A Filtering by the DSP, I mean, filtering by
22 the DSP you mean the complete sentence, right,

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1 **filtering by the DSP the binaural sound to alter**
2 **cues to prevent the user from experiencing**
3 **external localization so we are altering the cues**
4 **so that the user cannot -- we're changing the cues**
5 **in 1E so that the user could no longer experience**
6 **external localization.**
7 **BY MS. PIANA:**
8 Q Is that the same thing you're doing in 7E?
9 MR. HENRY: Hold on a second. I think you
10 cut Dr. Roginska.
11 MS. PIANA: Oh, apologies.
12 BY THE WITNESS:
13 **A No problem.**
14 **In 1E the binaural sound has its cue**
15 **altered to prevent external localization. Now,**
16 **altered means changed. In 7E altering the user --**
17 **alerting the user that the user is leaving the**
18 **environment by altering processing of the binaural**
19 **sound to degrade the audio cues so 7E specifically**
20 **says you're altering the processing of the**
21 **binaural sound with the intention to degrade the**
22 **audio cues so that in order to prevent the user**

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1 **from experiencing external localization.**
2 **Here the word that is I think important is**
3 **to degrade the audio cues whereas in 1E we're**
4 **talking about altering the audio cues but, you**
5 **know, to a POSA, it would probably be very**
6 **similar. I'm going to alter the cues. In 7E I am**
7 **degrading the cues.**
8 Q I'm just trying to take this piece by
9 piece because I am not one of ordinary skill in
10 the art so I'm trying to understand but definitely
11 don't want you to think I'm trying to take things
12 out of context.
13 So what I'm trying to understand is is
14 filtering different than altering processing?
15 **A Filtering means really processing, right,**
16 **so you're filtering, you're changing the sound in**
17 **some way. So filtering is usually a general term**
18 **that you're altering the sound in some way and in**
19 **1E that filtering means here in this case you're**
20 **altering the cues so you're doing the filtering to**
21 **alter the cues to prevent the user from**
22 **experiencing external localization. In 7E, it**

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1 **says you're altering the processing of the**
2 **binaural sound to degrade the audio cues, you're**
3 **changing the processing.**
4 **So to a POSA, those two things would**
5 **really have been, you know, very similar or even**
6 **the same, you're doing some filtering with the DSP**
7 **to change the cues to degrade them so that the**
8 **user doesn't externalize -- doesn't locate**
9 **externally.**
10 Q Let's go now to Claim 14 and we'll look at
11 14E. Which is the limitation that begins alerting
12 the user, do you see that, Dr. Roginska?
13 **A I do.**
14 Q And so limitation 14E is different than 1E
15 and 7E, limitation 14E says: "Alerting the user
16 that the user is leaving the environment by
17 reducing a volume of the binaural sound that
18 localizes from the virtual image and that is being
19 provided to the user."
20 Do you see that?
21 **A I see that, yes.**
22 Q If you reduce the volume of the binaural

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1 sound, does that prevent the user from
2 experiencing external localization?
3 MR. HENRY: Objection to form. Incomplete
4 hypothetical.
5 BY THE WITNESS:
6 **A So if you reduce a volume depending -- it**
7 **depends on how much the volume is reduced, but it**
8 **could so reducing a volume of the binaural sound**
9 **could impact the localization of the virtual**
10 **image.**
11 **BY MS. PIANA:**
12 Q How much would you have to reduce the
13 volume to have an impact on the external
14 localization?
15 **A You know, it depends on many factors. It**
16 **depends on things like what the sound is, the**
17 **content of the sound, how loud it is. It could**
18 **depend also on things like any kind of noise**
19 **that's in the environment. So those are just a**
20 **few examples. I can't give you an exact number,**
21 **but there are several factors that could impact by**
22 **how much does it have to be reduced.**

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1 Q How would a POSA determine whether the
2 volume has been sufficiently reduced to prevent
3 the user from experiencing external localization?
4 **A How -- do you mean how they would measure**
5 **when external localization has been degraded or**
6 **how would they know that it could be degraded by**
7 **reducing the volume.**
8 Q Let's do both of those. So let's do the
9 first one.
10 How would a POSA determine whether the
11 volume has been sufficiently reduced to prevent
12 the user from experiencing external localization
13 by measuring?
14 **A I mean, a POSA can run -- so can ask**
15 **users, can run a test, for example, and say, all**
16 **right, here is your sound. I'm going to reduce**
17 **the volume. How do you perceive the spacial**
18 **saying, okay, I'm going to reduce it more, how do**
19 **you perceive the spacial saying, so that's one**
20 **example of a how a POSA can determine and it's**
21 **very common, my students do it all the time.**
22 **And what was the second part of that**

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1 **question?**
2 Q You had also mentioned that as opposed to
3 to measuring, how would a POSA know that the
4 external localization could be degraded by
5 reducing the volume?
6 **A I mean, a POSA would know because that is**
7 **common knowledge that all the factors I mentioned**
8 **before could have an impact on -- so all the**
9 **factors I mentioned such as external noise and**
10 **what kind of sound it is could have an impact it.**
11 **This is why a POSA, I go back to my definition**
12 **that it's a person who would have an undergraduate**
13 **degree in computer science engineering or music**
14 **technology and two years experience because person**
15 **of that level of education and experience would**
16 **know these things.**
17 Q Let's go back to your declaration -- I'm
18 sorry, let's go back to Clement. Clement was
19 Exhibit 4. Great. Thank you.
20 Okay. We've already spent a lot of time
21 talking about Clement but one of the aspects we
22 have not yet talked about with Clement is the

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1 sound.
2 So does Clement disclose binaural sound?
3 **A I believe I covered that in my**
4 **declaration. Just give me a moment. I've**
5 **refreshed my memory. Thank you.**
6 **What was your question again? Can you**
7 **please repeat in.**
8 Q Sure, does Clement disclose binaural
9 sound?
10 **A Well, as I'm going to point to my**
11 **declaration in Paragraph 97, I'm just going to go**
12 **straight to the last sentence of that paragraph.**
13 Q Okay.
14 **A Thank you. So I'm just going it read the**
15 **last sentence of Paragraph 97, where I say:**
16 **Clement discloses an audiovisual system configured**
17 **to generate a virtual immersive experience, but**
18 **provides little detail about the audio processing.**
19 Q So does Clement disclose binaural sound?
20 **A So Clement does not disclose binaural**
21 **sound.**
22 Q Does Clement disclose stereo sound?

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1 **A I don't believe he talks about stereo**
2 **sound but just give me one moment.**
3 **No, Clement does not describe stereo or**
4 **talk about stereo sound.**
5 Q Does Clement disclose mono sound?
6 **A Clement does not disclose mono sound.**
7 Q Does Clement disclose anything about the
8 location of the sound or where the sound is
9 perceived to come from?
10 MR. HENRY: Objection to form.
11 BY THE WITNESS:
12 **A I don't believe Clement discloses the**
13 **location of sounds and where they're coming from.**
14 **BY MS. PIANA:**
15 Q Does Clement say anything about a warning?
16 **A Clement does talk about, remember,**
17 **alerting and -- hold on. Give me one second. I**
18 **want to make sure I answer your question fully.**
19 **Yeah, Clement talks about a warning. I**
20 **can point you to where he discusses providing a**
21 **warning.**
22 Q Great.

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1 **A So in Clement if we go to Column 5, all**
2 **the way at the bottom, last two lines, so Line 66**
3 **and 67, so Clement says: For example the system**
4 **may issue a warning or indicator and/or may**
5 **automatically initiate a fluid or graceful**
6 **transition out of the virtual world when the user**
7 **is at position 4.**
8 Q So what kind of a warning does Clement
9 disclose?
10 **A I will point you to column No. 8, starting**
11 **at Line 14. Thank you.**
12 **"The warning indicator may include, for**
13 **example, a visual indicator and/or an audible**
14 **indicator and/or a physical indicator such as, for**
15 **example, a buzz or a vibration of the HMD 100. So**
16 **he talks about that the warning indicators, may be**
17 **visual, may be audio or may be physical.**
18 Q The audio warning indicators in Clement
19 such as a buzz as disclosed here at Line 16 would
20 that be a binaural warning?
21 **A It could be.**
22 Q You had testified previously that Clement

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1 doesn't disclose anything about binaural sound; is
2 that right?
3 MR. HENRY: Objection to form.
4 BY THE WITNESS:
5 **A Well, Clement does not talk about**
6 **specifically binaural form but it would have been**
7 **obvious to a POSA who was working in this field**
8 **that an audio signal could be a binaural signal or**
9 **it could be a monaural signal or another type of**
10 **signal.**
11 **BY MS. PIANA:**
12 Q What about an alert, does Clement describe
13 alert?
14 **A I don't think he talks specifically about**
15 **an alert. He talks about the warnings we just**
16 **read.**
17 Q You had testified earlier that a POSA
18 would consider a warning to be different than
19 alert, correct?
20 MR. HENRY: Objection to form,
21 mischaracterizes testimony.
22 BY THE WITNESS:

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1 **A I think what I said -- I don't think I**
2 **said that. I think what I said was to any person**
3 **including a POSA alert and a warning are very,**
4 **very similar. There's maybe just a different**
5 **emphasis in warning and alert in the meaning of**
6 **the word, but I think a POSA would have recognized**
7 **that alert and a warning are very similar if not**
8 **the same.**
9 **BY MS. PIANA:**
10 Q So is it your testimony now that an alert
11 and a warning are similar if not the same?
12 MR. HENRY: Objection to form.
13 BY THE WITNESS:
14 **A I think that alert, again, alert and a**
15 **warning are very similar. The emphasis of the**
16 **meaning of whether it's alert and a warning could**
17 **be different and the meaning of those sounds can**
18 **be different, but they're very similar in**
19 **character.**
20 **BY MS. PIANA:**
21 Q Sorry. What is very similar in character?
22 **A Alert and a warning. I mean, the type of**

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1 **sound that alert is and the sound that the warning**
2 **is are very similar. Typically a warning has a**
3 **different meaning because it recognizes that maybe**
4 **such as here as Clement notes he talks**
5 **specifically about warnings, right, but alert, a**
6 **POSA would have known that an alert would have**
7 **been exactly the same thing.**
8 Q Is this a POSA applying background
9 knowledge as of 2015 or a POSA applying background
10 knowledge as of 2019?
11 MR. HENRY: Objection to form.
12 BY THE WITNESS:
13 **A This is a POSA who would have had the**
14 **education that we described with a bachelor's**
15 **degree in computer science, engineering or music**
16 **technology and that would have had two years of**
17 **experience in the industry or doing research.**
18 **BY MS. PIANA:**
19 Q I understand but we'd established
20 previously that a POSA who has those
21 qualifications would have a different level of
22 background knowledge in 2015 versus a POSA who had

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1 those same level of qualifications in 2019.
2 Do you recall that?
3 MR. HENRY: Objection to form,
4 mischaracterizes testimony, is asked and answered
5 probably 50 times.
6 BY THE WITNESS:
7 **A So what we talked about is the definition**
8 **of POSA in my declaration and how I viewed the**
9 **experience and educational background of a POSA**
10 **when I considered these patents and when I wrote**
11 **my declaration. The field of warning, designing**
12 **warnings and alerts is a very, very long, long,**
13 **lapsing field and a person of any kind of skill of**
14 **ordinary -- a person of ordinary skill in this art**
15 **would know whether it was in 2015, 2010 or even**
16 **maybe before that a warning and an alert are very**
17 **similar in character and that in this case a**
18 **person who was reading Clement's patent and**
19 **description and reads warning would have known**
20 **that it was obvious that, yes, it could be a**
21 **warning, it could be alert. Both could be**
22 **presented.**

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1 **BY MS. PIANA:**
2 Q Do you consider yourself to be an expert
3 in the field of designing warnings and alerts?
4 MR. HENRY: Objection to form, ambiguous.
5 BY THE WITNESS:
6 **A The field of warnings and alerts is a very**
7 **big field, and I have done a lot of work in the**
8 **field of auditory displays which part of auditory**
9 **displays are alerts and warnings. So I know quite**
10 **a bit about the field of auditory displays and**
11 **warnings.**
12 MR. HENRY: Counsel, we've gone past an
13 hour again, and at the last break, Dr. Roginska
14 and I were of similar minds that we should take a
15 break closer than to an hour than an hour
16 and-a-half this time. So we'd appreciate it if we
17 could go off the record and you can continue your
18 questioning when we come back.
19 MS. PIANA: Okay. That's fine.
20 THE VIDEOGRAPHER: We are going off the
21 record at 4:53 p.m. Central time.
22 (A recess was had.)

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1 THE VIDEOGRAPHER: We're going back on the
2 record at 5:04 p.m. Central time.
3 BY MS. PIANA:
4 Q Dr. Roginska, before we took our break, we
5 were talking about Clement.
6 Do you recall that?
7 **A Yes.**
8 Q And I would like to go back to Clement.
9 You'd previously testified that Clement does not
10 disclose binaural sound.
11 Do you recall that?
12 **A Yes, I recall that.**
13 Q So does the word binaural appear anywhere
14 in Clement?
15 **A No.**
16 Q So Clement does not disclose binaural
17 sound?
18 **A Clement does not talk about binaural**
19 **sound.**
20 Q We were talking about the warnings that
21 are disclosed in Clement.
22 Do you recall that?

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1 **A I do.**
2 Q And we also were talking about the
3 difference between warning and alert but I don't
4 think we need to go over that anymore.
5 Let's look at your declaration at
6 Paragraph 172. And this sentence in your
7 declaration at Paragraph 172 says: "First as
8 discussed for element 14[e], Clement teaches
9 degrading the sound by reducing the volume".
10 Do you see that?
11 **A I do.**
12 Q Is it your position that reducing the
13 volume can degrade the sound?
14 **A Clement teaches degrading the sound by**
15 **reducing the volume and it is my opinion that you**
16 **can degrade the sound by reducing its volume.**
17 Q Let's go now to Sauk which is spelled
18 S-a-u-k.
19 MS. PIANA: Mr. Plummer, could you find
20 that in our exhibit folder, please.
21 (A certain document was marked Roginska
22 Deposition Exhibit 5 for identification,

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as of 02/27/2024.)
BY MS. PIANA:
Q Dr. Roginska, do you recognize document that has been marked as Exhibit 5?
A I do, and just give me one moment to download it and open it.
Okay. I'm with you.
Q Great. Is Sauk directed to a virtual reality game?
A Let me just get my head back to Sauk. One moment. So I described Sauk in my declaration and as Sauk pant titled: Method and Apparatus For Creating a Multi-Dimensional Communication Space For Use in a Binaural Audio System Describes that while most development efforts in binaural audio have been directed to simulating a virtual audio environment, binaural audio may also be used as a cue to provide the user with understandable information regarding their surroundings.
So he specifically teaches that the audio format, the dimension, and he talks about binaural, talks about stereo and mono, may be used

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to signify the importance of a sound.
Q So my question, Dr. Roginska, is does Sauk disclose a virtual reality game?
A Does it talk about a virtual reality game?
Sauk in his patent does not specifically talk about a virtual reality game.
Q Let's look at Sauk Column 10 around Line 15.
Do you see at column 10, Line 15 Sauk discloses: According to one aspect of the invention the type 2 metadata specifies a group to which the user of a particular BSS 400 has been assigned for example the group could be a squad of soldiers.
Do you see that?
A I see those sentences, yes.
Q If we go to Column 10, Line 44, Sauk discloses an embodiment of the invention regarding soldiers.
Do you see that?
A I see that.
Q So this embodiment of Sauk is talking

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about real live soldiers, not people playing a game, correct?
A That's how I understand it.
Q All right. We've already looked at the claims of the '179 patent and let's look at the claims of the '184 patent, which we haven't yet entered into as an exhibit.
MS. PIANA: Could you please pull up the '184 patent from our exhibit folder.
(A certain document was marked Roginska Deposition Exhibit 6 for identification, as of 02/27/2024.)
BY MS. PIANA:
Q Let's go to the last two pages of this exhibit and we'll look at these claims pretty quickly.
Claim 1 is structured similarly to Claim 1 of the '179 and I'd like you to look at limitation 1D that starts warning the user.
Do you see that Dr. Roginska?
A Yes, I see that.
Q The '184 patent limitation 1E requires

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warning the user that the user is leaving the 3D virtual environment by filtering by the DSP the binaural sound by altering a spectral cue and lower a volume of the sound playing to the user.
Do you see that?
A I do.
Q Let's go to Claim 7, please. And, again, Claim 7, limitation D, is directed to alerting the user that the user is leaving the environment by altering processing of the sound by the DSP to degrade a spacial cue and to lower the volume of the sound playing to the user.
Do you see that?
A I do.
Q And the last one is Claim 14 of the '184 patent, can we look at that, please. Could we go to Claim 14, please. And if you scroll up so we can see the last part of Claim 14, great, the last limitation of Claim 14 requires alerting the user that the user is leaving the virtual image in the environment, I'm not going to read the rest of it.
My point is each one of these claims that

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1 we've just looked at in the '184 patent requires
2 an alert or a warning; is that right?
3 **A That's correct.**
4 Q And the claims in the '179 patent that we
5 have spent so much time discussing, those also
6 require an alert or a warning, is that right?
7 **A That's correct.**
8 Q So let's go back to Sauk which was
9 Exhibit 5, please. And in particular let's look
10 at column 12. Yes, right around Line 14 under the
11 subheading Alerts & Warnings.
12 Do you see that?
13 **A I do.**
14 Q If we scroll down under this subheading
15 Alerts & Warnings, let's look at what's disclosed
16 starting on Line 33. So starting at Line 33, Sauk
17 discloses: "The type 2 metadata can include GPS
18 coordinates of a sensor that detected a hazard or
19 an estimated GPS location of the hazard as
20 detected by the sensor. When this RF signal is
21 received by a user's radio, the user's BSS 400
22 will use the type 2 metadata to determine whether

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1 the sensor 401 is relative to the user and provide
2 the user with an earcon as specified by the
3 enunciated data. The earcon would translate the
4 received enunciated data to a phrase like
5 "chemical toxin detected!", stay away, and would
6 be heard in a soldiers's 3D sound environment."
7 Do you see that disclosure in Sauk?
8 **A I do.**
9 Q So Sauk here expressly discloses that you
10 can have a 3D sound environment.
11 Do you see that?
12 **A That's right. A soldier's 3D sound**
13 **environment. I see that.**
14 Q And then moving on, in particular, the
15 sound environment manager 494 will use GPS
16 coordinates provided by the sensor 401 and GPS
17 coordinates provided of the user as provided by
18 the internal GPS generator 402 to determine the
19 direction of the hazard relative to the user, the
20 audible warning would thus alert the user it that
21 he is too close to the lethal toxin and by
22 listening to the 3D binaural audio the user would

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1 be able to ascertain a direction of the sensor 401
2 and/or the associated hazard, cons subsequently
3 the user would know which direction to move away
4 from in order to escape the affected area.
5 Do you see that in Sauk?
6 **A I do.**
7 Q What kind of audio does Sauk because as a
8 warning here in this section?
9 MR. HENRY: Objection to form.
10 BY THE WITNESS:
11 **A Be what kind of audio?**
12 **BY MS. PIANA:**
13 Q Yes.
14 **A The type of sounds that he describes as an**
15 **example, like earcons, is that what you mean?**
16 Q I mean is it binaural audio?
17 **A So in this case, Sauk discloses using**
18 **station audio to position a sound in an**
19 **environment.**
20 Q And is spacial audio another way of saying
21 binaural audio?
22 **A Yes.**

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1 Q As a POSA, why do you think Sauk uses
2 binaural audio for the warning as disclosed in
3 this section?
4 MR. HENRY: Objection to form.
5 BY THE WITNESS:
6 **A Well, you know, Sauk talks about in an**
7 **earlier section so in the B section the context**
8 **for Sauk is there is what he calls the selective**
9 **relevance mode and this is described in Sauk just**
10 **next door here on Column 11 starting at Line 25.**
11 **BY MS. PIANA:**
12 Q I understand. I would like to stick with
13 column 12 under the subsection heading Alerts &
14 Warnings because that's what we're talking about?
15 MR. HENRY: I'm not sure Dr. Roginska was
16 done answering. I think you cut her off.
17 BY THE WITNESS:
18 **A I was hoping we could go -- I think it's**
19 **important to understand not just one section of**
20 **Sauk by the context of why Sauk is describing in**
21 **Section C the section about alerts and warnings.**
22 **So if we could go to Column 11 --**

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1 **BY MS. PIANA:**
2 Q Let me just finish my question around
3 column 12 and then we can go to Column 11?
4 MR. HENRY: She was responding to your
5 question, Counsel, and this is the second time
6 you've interrupted her in the middle of her answer
7 in just this colloquy. You've done it repeatedly
8 throughout the day. Let her answer fully before
9 you interrupt the witness.
10 Go ahead, Doctor.
11 MS. PIANA: Counsel, before we get to
12 Dr. Roginska, I have to point out that these types
13 of speaking objections are completely against the
14 rules under the PTAB proceedings and I would ask
15 you politely to refrain from making them in the
16 future.
17 MR. HENRY: I was just asking you not to
18 interrupt my witness. That's not even an
19 objection. This is just telling you don't
20 interrupt the witness as every questioning
21 attorney knows you let the witness answer the
22 question. So stop interrupting the witness.

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1 MS. PIANA: I will stop interrupting the
2 witness if you stop making these speaking
3 objections. You did not use the word objection
4 but you were clearly instructing her what to do.
5 MR. HENRY: I'm instructing you not to
6 interrupt the witness but I appreciate you saying
7 you will stop interrupting my witness. I'll make
8 the objections I'm going to make.
9 Dr. Roginska, please complete your
10 response.
11 BY THE WITNESS:
12 **A Thank you.**
13 **So if we could go to Column 11 of Sauk,**
14 **starting at Line 25. Thank you. So Sauk**
15 **describes what he calls the selective relevance**
16 **mode, and the selective relevance mode talks about**
17 **and I will read a little bit, the selective**
18 **filtering techniques described above can be**
19 **utilized by the BSS or the binaural sound system**
20 **in another configuration which combines a**
21 **plurality of audio dimensions such as 3D,**
22 **binaural, 2D, stereophonic and 1D monophonic, for**

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1 **example, in certain circumstances a user may not**
2 **want to eliminate all background audio**
3 **information, however, rather than keeping the less**
4 **relevant audio in the same audio dimension**
5 **whatever their desired binaural sound sources a**
6 **user could change the less relevant audio to a**
7 **monophonic 1D or stereophonic 2D dimension. The**
8 **effect of changing an audio format for sounds from**
9 **binaural to monophonic or it stereophonic audio**
10 **signifies a different level of relevancy or**
11 **importance for such audio. The process also**
12 **removes any localization cues for that audio.**
13 **Thus the level of the 1D, 2D, or 3D audio can be**
14 **adjusted to whatever the listener desires for that**
15 **dimension.**
16 **So it's important to note in this section**
17 **in Sauk because the selective relevance mode goes**
18 **directly to your question, Counsel, which is why**
19 **a -- why Sauk describes here using 3D sound and of**
20 **positioning the earcons in this example, he gives**
21 **the example of "chemical toxin detected!", why**
22 **using 3D sound would be important to heighten the**

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1 **relevance of that warning.**
2 **BY MS. PIANA:**
3 Q So Sauk column 12 includes a subheading
4 titled Alerts & Warnings, correct?
5 **A That's correct.**
6 Q And the claims in the '179 and the '184
7 patents that we were talking about today are
8 directed to Alerts & Warnings; is that correct?
9 MR. HENRY: Objection to form.
10 BY THE WITNESS:
11 **A The '179 and '184 patent described using**
12 **warnings and alerts.**
13 **BY MS. PIANA:**
14 Q Okay. The section of Sauk that you were
15 just looking at, Dr. Roginska, is under a separate
16 heading, right?
17 **A I'm sorry, which section are you referring**
18 **to right now?**
19 Q The section starting in Column 11 that I
20 were just referring to, Dr. Roginska, that is
21 under a separate subheading; is that correct?
22 **A That's -- it's a separate heading from the**

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1 **heading of the Alerts & Warnings, yes.**
2 Q Right. Under the Alerts & Warnings
3 subheading, what type of alert or warning does
4 Sauk disclose?
5 **A Well, here he specifically talks about --**
6 **I'll read the audible warning would thus alert the**
7 **user that he's too close to the lethal toxin and**
8 **by listening to the 3D binaural audio the user**
9 **would be able to ascertain a direction of the**
10 **sensor. So he is talking about here specifically**
11 **about 3D binaural audio in that example.**
12 Q Does Sauk disclose using any other type of
13 audio for alert or warning?
14 **A In the example I think he gives in that**
15 **section and he does list them as an example and**
16 **I'm going to just redirect you to column 12, line**
17 **starting at 17, so he says or starting at 15**
18 **really: "In addition to voice communication,**
19 **other types of information can be superimposed**
20 **into the sound field using type 1 and type 2**
21 **metadata. For example, sensor information can be**
22 **detected by using one or more sensors. And the**

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1 **sensor information can be integrated into a format**
2 **corresponding -- into a format corresponding to**
3 **signal. This signal is then transmitted to**
4 **various users and received using a BSS 400**
5 **associated with each user."**
6 **So in this particular example that he**
7 **lists, he talks about using the BSS, which is the**
8 **binaural sound system, to render the sounds.**
9 Q So under this section in Sauk, subtitled
10 Alerts & Warnings, the only type of alert or
11 warning that is disclosed is binaural; is that
12 correct?
13 MR. HENRY: Objection to form.
14 BY THE WITNESS:
15 **A In the examples that are given under**
16 **Section C, the examples talk about the 3D sound**
17 **binaural sound.**
18 **BY MS. PIANA:**
19 Q And the reason for using 3D binaural under
20 this Alerts & Warnings is so the soldier can
21 detect the location of the hazard; is that
22 correct?

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1 **A Yes. I would say that's fair.**
2 Q Does Sauk disclose under this Alerts &
3 Warnings section lowering the volume of a warning?
4 **A In Section C specifically under the Alerts**
5 **& Warnings, Sauk I don't believe talks about**
6 **lowering the volume.**
7 Q And, in fact, what Sauk discloses under
8 Section C is that the phrase, this is at Line 40,
9 if you could move down a little bit in the Zoom,
10 please, thank you. At Line 39 the earcon would
11 translate the received enunciated data to a phrase
12 like "chemical toxin detected, stay away!" with an
13 exclamation point at the end.
14 Do you see that?
15 **A I see that.**
16 Q As a POSA would you interpret the use of
17 the exclamation point at the end of the warning
18 disclosed here in Sauk mean that the volume would
19 be lowered?
20 MR. HENRY: Objection to form.
21 BY THE WITNESS:
22 **A I don't think I would relate the**

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1 **exclamation point to the volume being increased or**
2 **decreased.**
3 **BY MS. PIANA:**
4 Q So you think that a warning regarding the
5 location of a chemical toxin could be at a
6 decreased volume?
7 MR. HENRY: Objection to form.
8 BY THE WITNESS:
9 **A I'm sorry. Could you say that again?**
10 **BY MS. PIANA:**
11 Q Sure. Would you as a POSA think that a
12 warning regarding the location of a chemical toxin
13 would be decreased?
14 MR. HENRY: Objection to form, ambiguous.
15 BY THE WITNESS:
16 **A I mean, as a POSA I don't -- I wouldn't --**
17 **I mean, from reading this or even thinking about**
18 **the volume of a warning based on this specific**
19 **warning, I don't -- I don't think I would think**
20 **whether that warning would be decreased in volume**
21 **or increased in volume. I don't think there's**
22 **anything here that as you said points to**

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1 **decreasing or increasing the volume.**
2 **BY MS. PIANA:**
3 Q What do you think is the significance of
4 the exclamation point used in Line 41?
5 MR. HENRY: Objection to form.
6 BY THE WITNESS:
7 **A This is a phrase. It could mean inflexion**
8 **of the words.**
9 **BY MS. PIANA:**
10 Q Let's go back to your declaration,
11 Paragraph 112. Let's look at this last sentence,
12 well, actually the last two sentences. So a POSA
13 would understand that because users are able to
14 perceive changes in audio dimension incorporating
15 a change in audio dimension to the binaural audio
16 warning of Clement and Osman would enhance the
17 user's ability of the user to perceive the
18 warning. A POSA would have been motivated to make
19 this change in order to enhance the effectiveness
20 of the warning to ensure the warning would be
21 heeded by the user.
22 Do you see that?

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1 **A I see that.**
2 Q What is the change that you are referring
3 to in that last sentence in Paragraph 112?
4 **A The change that I'm referring to is**
5 **described -- the sentence before as you read: A**
6 **POSA would understand that because users are able**
7 **to perceive changes in audio dimension**
8 **incorporating a change in audio dimension in the**
9 **binaural audio warning of Clement and Osman would**
10 **enhance the user's ability of the user to perceive**
11 **the warning.**
12 **So when I say a POSA would have been**
13 **motivated to make this change, I'm referring to**
14 **the change in the audio dimension.**
15 Q All right. And the last sentence you say
16 that that would enhance the effectiveness of the
17 warning to ensure the warning would be heeded by
18 the user.
19 Why is it important -- sorry, I didn't
20 mean to talk over you.
21 Why is it important for a user to heed a
22 warning?

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1 **A In situations such as, for example, the**
2 **one that we just read in Sauk where you have a**
3 **soldier and there's a chemical something and you**
4 **want to make sure that the user here's a warning**
5 **and you want to enhance the effectiveness of the**
6 **warning, in addition to, it for example, we talked**
7 **about in Clement as you leave the environment**
8 **you're fading out the sound, warning the user that**
9 **they're leaving the environment, in addition to**
10 **that, as a way to enhance and to make sure that**
11 **the user is hearing the warning, a POSA would be**
12 **motivated to change the dimension of the sound so**
13 **that the user hears the warning for sure.**
14 Q So back as we were talking about in Sauk,
15 you've got a soldier who is being warned about a
16 chemical toxin.
17 Do you recall that?
18 **A I do.**
19 Q So to ensure that that soldier would heed
20 the warning, would you reduce the volume?
21 **A Reduce the volume of what?**
22 Q Of the warning.

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1 **A But that's not what Sauk talks about here.**
2 **He's talking about changing the dimension.**
3 Q I understand. But back on Sauk, we can go
4 back to Sauk if you don't mind, please, that's
5 Exhibit 5. All right. So here we are again Sauk
6 column 12, the earcon would translate the received
7 enunciated data to a phrase like "chemical toxin
8 detected, stay away!", that's the warning that is
9 disclosed in this section of Sauk, correct?
10 **A That's correct.**
11 Q So here with the chemical toxin to the
12 soldier, would you reduce the volume of the
13 warning?
14 MR. HENRY: Objection to form.
15 BY THE WITNESS:
16 **A I wouldn't reduce the volume.**
17 **BY MS. PIANA:**
18 Q And here in Sauk we also discussed how the
19 warning is given in binaural sound so the user can
20 know I'm quoting here it from Line 50, which
21 direction to move away from in order to escape the
22 affected area, correct?

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1 **A That's right.**
2 Q Let's go back over to Column 11 in Sauk
3 under the selective relevance mode.
4 How does Sauk disclose switching from 3D
5 to 2D to 1D audio?
6 **A So in the selective relevance mode**
7 **section, Sauk describes the different dimensions**
8 **as we talked about before, 3D binaural, 2D**
9 **stereophonic, 1D monophonic. And in the next**
10 **paragraph, he describes in order to implement the**
11 **foregoing effects separate binaural audio**
12 **environments can be defined for each predetermined**
13 **group of users thereafter each BSS 400 can use**
14 **received metadata to determine a group of a user**
15 **from which enunciated data originated. Enunciated**
16 **data received from various users within the user's**
17 **predetermined group will be presented in a**
18 **binaural format. In particular the sound**
19 **environment manager 494 will use the type 1**
20 **metadata 604-1 to determine if a signal originated**
21 **with a member of particular group. Enunciated**
22 **data originating from members of the same group**

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1 **will be reproduced for a user of each BSS 400 in a**
2 **3D binaural audio environment each BSS four can**
3 **process enunciated data for group members using**
4 **type 2 metadata to create binaural audio to**
5 **represent where members of that user's group are**
6 **located.**
7 Then he continues: "According to a
8 preferred embodiment, the BSS 400 will also
9 receive RF signal 600 from users associated with
10 at least a second one of the predetermined groups
11 of users. Such RF signals can be identified based
12 by using type 1 metadata. The enunciated data 602
13 from these signals is also reproduced at headset
14 108 and can be audibly perceived by the user.
15 Significantly, however, BSS 400 can be configured
16 to reproduce such audio in a different audio,
17 format, for example, rather than reproducing such
18 audio in a 3D binaural format, the audio can be
19 represented in 1D monophonic format. Because this
20 audio is not presented with the same audio effect,
21 it is perceived differently by a user. The user
22 can use this distinction to selectively focus on

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1 the voices of members of their own group."
2 So here he describes how the switch might
3 happen.
4 Q So in particular I'd like to draw your
5 attention to Column 11, Line 64, the sentence that
6 starts: For example, rather than reproducing such
7 audio in 3D binaural format, the audio can be
8 presented in 1D monophonic format.
9 So Sauk discloses reproducing audio from a
10 1D format to a 3D binaural format?
11 **A Sauk describes, yes, so switching from a**
12 **3D to a 1D format in this case as an example.**
13 Q And that switching involves reproducing
14 that audio; is that correct?
15 **A What do you mean by reproducing?**
16 Q As a POSA what do you think Sauk means by
17 reproducing?
18 **A Rather than reproducing meaning playing**
19 **the audio in a 3D binaural format, the audio can**
20 **be presented in a 1D monophonic format meaning**
21 **that the sound instead of being filtered and**
22 **processed to be played and reproduced in binaural**

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1 **format can be processed to be reproduced in a**
2 **monophonic format.**
3 MS. PIANA: We are at a pretty good
4 stopping point right now. Why don't we take a
5 break and come back on the record after about 10
6 minutes.
7 MR. HENRY: Okay.
8 THE VIDEOGRAPHER: We're going off the
9 record at 5:44 p.m. Central time.
10 (A recess was had.)
11 THE VIDEOGRAPHER: We're going back on the
12 record at 6:00 p.m. central time.
13 BY MS. PIANA:
14 Q Dr. Roginska, I'd like to go back to the
15 '140 application which is Exhibit 3. And in
16 particular I would like to go to the PDF Page 120.
17 Yes, right there, great.
18 So here at Line 22, the end of Line 22, it
19 starts. As another example when Alice enters the
20 car, a system in the car pairs with the HPED and
21 automatically switches the call from binaural to
22 mono.

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1 Do you see that?
2 **A I see that.**
3 Q So when Alice is outside of the car, Alice
4 is in a physical space, correct?
5 **A Let me just get my head back to this**
6 **example that we were on before. If you don't mind**
7 **I'd like to just read from Line 20 so I'm back in**
8 **that example.**
9 Q Okay.
10 **A Yes, thank you. I've read it.**
11 Q When Alice is outside of her car, she is
12 it in a physical space; is that correct?
13 **A Yes.**
14 Q And then Alice enters her car, that's at
15 Line 23, and that would be in a different physical
16 space; is that correct?
17 **A Yes.**
18 Q And so the transition that Alice makes
19 from one physical space outside of her car to a
20 different physical space inside her car triggers
21 her audio to change from binaural to mono; do you
22 see that?

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1 **A I see that, yes.**
2 Q So that change in her audio from binaural
3 to mono is that a change in her 3D soundscape
4 environment?
5 MR. HENRY: Objection to form.
6 BY THE WITNESS:
7 **A Well, that change from when it**
8 **automatically switches the call from binaural to**
9 **mono is a change in -- the processing is a change**
10 **in what Sauk referred to as the dimension of the**
11 **sound, of the audio.**
12 **BY MS. PIANA:**
13 Q What triggers that change in this example?
14 **A So this example, what triggers the change**
15 **is when Alice enters the car.**
16 Q And is that change a change in her audio
17 environment?
18 **A I'm sorry. Can you repeat that?**
19 Q Sure. Is that change from binaural to
20 mono is that a change in her audio environment?
21 MR. HENRY: Objection to form.
22 BY THE WITNESS:

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1 **A When you say the word environment, it's a**
2 **change in the processing, it's a change in the**
3 **dimension, the type of sound so from binaurals we**
4 **discussed before to mono is a different way of**
5 **processing the sound.**
6 **BY MS. PIANA:**
7 Q So it is a change in the sound, correct?
8 **A It says here that yeah, it's a change from**
9 **binaural to mono, so it's a change from binaural**
10 **sound to mono sound.**
11 Q Let's go to Page 96, that's the PDF page
12 number of this same exhibit if you look around
13 Line 11, I'll let you read that whole paragraph
14 there starting by way of introduction?
15 **A Yes, I have read it.**
16 Q So at Line 13, and this is the '140
17 application, it describes a three-dimensional
18 soundscape or 3D sound environment where sounds
19 can be localized to points around the listener.
20 Do you see that?
21 **A I see that.**
22 Q So let's stay here on this page but I want

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1 to talk more about Alice.
2 So when Alice is outside of the car, she
3 is getting binaural audio.
4 Do you recall that from the example we
5 were just discussing?
6 **A I do.**
7 Q So when Alice is getting binaural audio,
8 is she in a 3D sound environment?
9 **A Well, the environment that Alice is in**
10 **when she's outside the car is in the physical**
11 **environment so she is in an environment and she's**
12 **hearing through her headphones I believe 3D sound.**
13 Q And then when she gets in the car, she is
14 no longer hearing 3D sound; is that correct?
15 **A That's right. When she went from outside**
16 **the car to inside the car, her sound switched I**
17 **believe from binaural to mono.**
18 Q So when she is inside the car she's in an
19 environment where she is no longer receiving 3D
20 sound; is that correct?
21 **A That's what the example stated.**
22 Q Let's now go back to your declaration and

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1 in particular I would like to turn to Page 55.
2 This is around Paragraph 91. And so here in
3 Paragraph 91 you've got a table that lists the
4 '179 patent and further down it lists the '184
5 patent and the various grounds that are being
6 asserted in these IPR cases.
7 Do you see that?
8 MR. HENRY: Objection to form.
9 BY THE WITNESS:
10 A Yeah, I see the table with the patents
11 listed, the grounds, the relevant prior art and
12 the claims for each patent and each ground.
13 BY MS. PIANA:
14 Q You don't have any opinions on
15 combinations other than what's listed in this
16 table here, correct?
17 MR. HENRY: Objection to form,
18 mischaracterizes the document.
19 BY THE WITNESS:
20 A I list my opinions in the document and
21 describe them separately in the document.
22 BY MS. PIANA:

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1 Q But those opinions and combinations are
2 all contained within your declaration document,
3 correct?
4 A Yeah, my entire declaration document, yes.
5 Q So all of your opinions regarding the '179
6 patent and the '184 patent are contained within
7 this declaration; is that correct?
8 A That's correct.
9 MS. PIANA: At this point, let's take
10 another break.
11 MR. HENRY: Off the record, please.
12 THE VIDEOGRAPHER: We are going off the
13 record at 6:10 p.m. Central time.
14 (A recess was had.)
15 THE VIDEOGRAPHER: We're going back on the
16 record at 6:17 p.m. Central time.
17 BY MS. PIANA:
18 Q Dr. Roginska, let's move on to the '836
19 patent.
20 MS. PIANA: So Mr. Plummer could you find
21 the declaration in the folder entitled Roginska
22 '836 declaration.

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1 (A certain document was marked Roginska
2 Deposition Exhibit 7 for identification,
3 as of 02/27/2024.)
4 BY MS. PIANA:
5 Q Dr. Roginska, do you recognize the
6 document that has been be marked as Exhibit 7?
7 A I do.
8 Q Could you identify this document for us,
9 please?
10 A It is my declaration for the '836 patent.
11 Q Regarding the '836 patent, you don't have
12 any opinions on combinations other than what's
13 listed in this document; is that correct?
14 A That's correct.
15 Q So all of your opinions regarding the '836
16 patent are contained within this declaration; is
17 that correct?
18 A That's correct.
19 MS. PIANA: At this point I have no
20 further questions for the witness.
21 MR. HENRY: Great. I have a few
22 questions.

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1 EXAMINATION
2 BY MR. HENRY:
3 Q Dr. Roginska, could you pull up Clement
4 again, please.
5 AV TECH PLUMMER: One moment.
6 BY MR. HENRY:
7 Q Let me know when you have it.
8 A I have it.
9 Q Okay. Let's go look at Column 3, lines
10 beginning at Line 42 and let me know when you're
11 there.
12 A Line 42?
13 Q Yes. Are you there?
14 A I'm there.
15 Q Do you remember discussing with opposing
16 counsel whether the HMD in Clement could determine
17 the location of a user?
18 A I do.
19 Q Do you see in Column 3 where Clement
20 discloses a system for transitioning from a
21 virtual or augmented reality environment to an
22 ambient environment?

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1 **A I see is that.**
2 Q It goes on to say the system 200 may
3 include a user electronic device 250, right?
4 **A That's right.**
5 Q For example an electronic device 250 can
6 be a HMD, right?
7 **A Right.**
8 Q And then if you go down to Line 51, you
9 see where it tells you that electronic device 250
10 may include a sensing system 260 and a control
11 system 270, right?
12 **A Yes.**
13 Q And then in lines 55 to 57 what components
14 of that electronic device with its sensing system
15 are disclosed?
16 **A So in the example embodiment shown in**
17 **Figure 2 the sensing system 260 includes a light**
18 **sensor 262, a distance/proximity sensor 263, and**
19 **an audio sensor 264 and the control system 270**
20 **includes a power control device 271.**
21 Q So those are sensors that Clement
22 discloses can be in its HMD?

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1 **A That's correct.**
2 Q Let's look down at column 7 now and
3 Line 7. Let me know when you're there.
4 **A I'm there.**
5 Q Do you see here that Clement discloses
6 that the HMD 100 may include a sensor that detects
7 the user user's proximity to a boundary of the
8 tracking area 320?
9 MS. PIANA: Objection. Form.
10 BY THE WITNESS:
11 **A I see that's what it says, yes.**
12 **BY MR. HENRY:**
13 Q So this is another example where Clement
14 discloses that the HMD can detect the user's
15 location in proximity to a boundary, right?
16 MS. PIANA: Objection. Form.
17 BY THE WITNESS:
18 **A That's correct.**
19 **BY MR. HENRY:**
20 Q And then do you see in Line 12 of
21 column 7, where, again, Clement discloses that its
22 HMD can have a proximity sensor to make these

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1 determinations?
2 **A That's correct.**
3 Q Now, Dr. Roginska, at the end of
4 questioning from 8K's counsel you were asked about
5 the declaration you submitted that related to the
6 '836 patent, right?
7 **A Yes, that's correct.**
8 Q Other than those questions, Counsel for 8K
9 did not ask you any questions about any of the
10 substance of your opinions relating to the '836
11 patent today, right?
12 MS. PIANA: Objection. Form.
13 BY THE WITNESS:
14 **A That's correct.**
15 **BY MR. HENRY:**
16 Q You were prepared to answer such questions
17 today?
18 MS. PIANA: Objection. Form. Sorry.
19 BY THE WITNESS:
20 **A Yes, I was.**
21 MR. HENRY: I have no further questions.
22 Anything else?

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1 MS. PIANA: Yes. Just a few more
2 questions.
3 FURTHER EXAMINATION
4 BY MS. PIANA:
5 Q Let's go back and look at --
6 MS. PIANA: Let's take a break.
7 THE VIDEOGRAPHER: We're going off the
8 record at 6:24 p.m. Central time.
9 (A recess was had.)
10 THE VIDEOGRAPHER: We're going back on the
11 record at 6:29 p.m. Central time.
12 BY MS. PIANA:
13 Q Okay, Dr. Roginska, just a few questions
14 about Clement.
15 MS. PIANA: So let's pull Clement back up,
16 please, and let's look at Column 3, Line 42.
17 BY THE WITNESS:
18 **A Uh-huh.**
19 **BY MS. PIANA:**
20 Q And do you see that the first sentence of
21 this paragraph is: A block diagram of a system
22 200 for transitioning from a virtual/augmented

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1 reality environment to an ambient environment is
2 shown in Figure 2.
3 Do you see that?
4 MR. HENRY: Objection to form.
5 BY THE WITNESS:
6 **A I see those words written, yes.**
7 **BY MS. PIANA:**
8 Q Great. Great. So Clement characterizes
9 the system 200 as a system for transitioning; is
10 that correct?
11 **A A block diagram of a system 200 for**
12 **transitioning from a virtual/augmented reality**
13 **environment to a ambient environment, yes.**
14 Q And then further down in this column
15 around lines 55 to 57, thank you, it says starting
16 at the end of Line 54. In the example embodiment
17 shown in Figure 2, the sensing system 260 includes
18 a light sensor 262, a distance/proximity sensor
19 263, and an audio sensor 264, and the control
20 system 270 includes a power control device 271, a
21 pause control device 272, -- I'm not going to
22 spend anymore time reading the rest of this

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1 sentence, it's a very long sentence, but do you
2 see where I'm quoting from in Clement,
3 Dr. Roginska?
4 **A Yes, I see that section.**
5 Q Does this sentence disclose anything about
6 how the distance or proximity sensor 263 would
7 determine the user's position within the tracking
8 area?
9 **A This particular section talks about the**
10 **sensing system and all the components that it**
11 **includes.**
12 Q Does this section include any disclosure
13 teaching how the proximity sensor would determine
14 the user's position within the tracking area?
15 **A This particular section doesn't disclose**
16 **how this would be done, no.**
17 Q Let's go to column 7, I think you
18 mentioned that one also. Around Line 12. All
19 right. And so I'm looking at actually Line 7, the
20 sentence that starts: In some embodiments, the
21 HMD 100 may include a sensor that detects the
22 user's proximity to a boundary of the tracking

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1 area 320 or that the user is within a threshold
2 distance of a boundary of the tracking area 320.
3 Do you see that?
4 **A I do.**
5 Q Does this disclosure in Clement reveal
6 anything about how the HMD or how the proximity
7 detector detects a user's location within the
8 tracking area 320?
9 **A Well, if we keep on reading the following**
10 **sentence, for example, one of the sensors of the**
11 **sensing system 160 such as for example proximity**
12 **sensor 163 and/or the camera 180 of HMD 100 may**
13 **detect this proximity to the boundary and the**
14 **control system 170/processor 190 may initiate the**
15 **transition process as described above.**
16 Q Let's go to Figure 3A. So we looked at
17 this several times today.
18 So that disclosure that you were just
19 reading in that was what was, column 7, says: For
20 example, one of the sensors of the sensing system
21 such as, for example, a proximity sensor 163
22 and/or the camera 180 of the HMD 100 may detect

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1 this proximity to the boundary and the control
2 system processor may initiate the transition
3 process as described above. Okay. I just wanted
4 to remind us what that said.
5 Here we are looking at Figure 3A. So the
6 user has the HMD on their head, correct?
7 **A Correct.**
8 Q And the disclosure we just looked at in
9 column 7 discloses that the HMD that's on the
10 user's head may have a camera; is that correct?
11 MR. HENRY: Objection to form,
12 mischaracterizes the document.
13 BY THE WITNESS:
14 **A What we just read says that as an example**
15 **one of the sensors of the sensing system 160**
16 **and/or the camera of the HMD 100 may detect this**
17 **proximity to the boundary and the control system**
18 **and processor may initiate the transition process**
19 **as described above.**
20 **BY MS. PIANA:**
21 Q So as a POSA how would a camera on the HMD
22 detect this invisible boundary that's here at the

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1 bottom of Figure 3A? This is the one that is
2 horizontal and runs between point four and point
3 five, how could a camera see an invisible
4 boundary?
5 MR. HENRY: Objection. Form,
6 argumentative, asked and answered a few times
7 earlier today and beyond the scope of my redirect.
8 BY THE WITNESS:
9 A So, I'm sorry, what was the question, how
10 would the camera on the HMD detect the invisible
11 line?
12 BY MS. PIANA:
13 Q Yes.
14 MR. HENRY: Same objections.
15 BY THE WITNESS:
16 A Well, I mean Clement here specifically in
17 this passage doesn't describe how it would detect
18 it. It describes that it could detect it given
19 the sensors that it has and it describes the
20 sensors on the HMD.
21 BY MS. PIANA:
22 Q Turning to the '836 declaration which we

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1 had marked as Exhibit 7, do you stand by all of
2 the opinions as stated in the '836 declaration?
3 A I do.
4 MS. PIANA: All right. No further
5 questions.
6 MR. HENRY: I have nothing further. Thank
7 you, Dr. Roginska.
8 THE VIDEOGRAPHER: Since there are no more
9 questions, this marks the end of the video
10 deposition of Dr. Roginska. We are going off the
11 record and ending her deposition at 6:38 p.m.
12 Central time. Thank you.
13 (Deposition concluded at 6:38 p.m. CST.)
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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC
2 I, Theresa A. Vorkapic, Certified
3 Reporter and Notary Public within and for the
4 State of Illinois do hereby certify:
5 That DR. AGNIESZKA ROGINSKA, the witness
6 whose deposition is hereinbefore set forth,
7 Was duly sworn by me before the
8 commencement of such deposition and that such
9 deposition was taken before me and is a true
10 record of the testimony given by such witness.
11 I further certify that the adverse
12 party, patent owner, was represented by counsel at
13 the deposition.
14 I further certify that the deposition of
15 DR. AGNIESZKA ROGINSKA, occurred virtually on
16 Tuesday, February 27, 2024, commencing at 9:30 to
17 6:38 p.m.
18 I further certify the inspection,
19 reading and signing of said deposition was
20 waived on the record by agreement of all parties.
21 I further certify that I am not related
22 to any of the parties to this action by blood

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1 or marriage, I am not employed by or an attorney
2 to any of the parties to this action, and that I
3 am in no way interested, financially or otherwise,
4 in the outcome of this matter.
5 IN WITNESS WHEREOF, I have hereunto set
6 my hand this 29th day of February, 2024.
7
8 Theresa A Vorkapic
9
10 Theresa A. Vorkapic
11 My commission expires November 6, 2027.
12 NOTARY PUBLIC IN AND FOR THE
13 ILLINOIS
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