Transcript of Richard Stern, Ph.D.

Date: April 8, 2026
Case: Amazon, Inc., et al. -v- SoundClear Technologies, LLC (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3 AMAZON.COM, INC.;

4 AMAZON.COM SERVICES LLC; and

5 AMAZON WEB SERVICES, INC.;

6 Petitioners,

7 v.

8 SOUNDCLEAR TECHNOLOGIES LLC,

9 Patent Owner.

10 IPR2025-00565

11 U.S. Patent No. 11,069,337

12 IPR2025-00673

13 U.S. Patent No. 11,244,675

14

15 VIDEOTAPED DEPOSITION OF

16 RICHARD STERN, PH.D.

17 Conducted Remotely Over Zoom

18 Wednesday, April 8, 2026

19 12:07 p.m.

20 Job No.: 627236

21 Pages 1 - 147

22 Reported By: Joan V. Cain

1 Videotaped Deposition of RICHARD STERN,
2 PH.D., conducted remotely over Zoom:
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15 Pursuant to Notice, before Joan V. Cain,
16 Court Reporter and Notary Public in and for the
17 Commonwealth of Virginia.
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21
22

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1 A P P E A R A N C E S
2
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1 A P P E A R A N C E S C O N T I N U E D
2
3 ALSO PRESENT:
4 Parker Simpson, Legal Videographer
5 Planet Depos, LLC
6
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C O N T E N T S

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By Mr. Reynolds 9

By Mr. Reeves 140

E X H I B I T S

(Attached to the Transcript.)

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PREVIOUSLY MARKED EXHIBITS REFERENCED

EXHIBIT 1001 U.S. Patent No. 11,244,675 B2 56

EXHIBIT 1002 Declaration of Richard Stern, Ph.D., 2/25/25 55

EXHIBIT 1003 U.S. Patent Application Publication No. 2017/0083281 A1 124

EXHIBIT 1016 U.S. Patent No. 9.680,983 B1 96

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1 E X H I B I T S

2 (Attached to the Transcript.)

3 PREVIOUSLY MARKED EXHIBITS REFERENCED

4 EXHIBIT 1202 Reply Declaration of 52

5 Richard Stern, Ph.D.,

6 3/18/26

7 EXHIBIT 1208 U.S. Patent Application 127

8 Publication No.

9 2016/0379638 A1

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1 P R O C E E D I N G S
2 - - -
3 12:07 p.m. EDT
4 April 8, 2026
5 - - - 12:07:43
6 THE VIDEOGRAPHER: Here begins the 12:07:52
7 videotaped deposition of Dr. Richard Stern, in the 12:07:54
8 matter of Amazon.com, Incorporated; Amazon.com 12:07:57
9 Services LLC; and Amazon Web Services, Incorporated 12:07:57
10 versus SoundClear Technologies LLC, in the United 12:08:09
11 States Patent and Trademark Office, Before the 12:08:10
12 Patent Trial and Appeal Board, Case Nos. 12:08:13
13 IPR2025-00565 and IPR2025-00673. 12:08:15
14 Today's date is April 8, 2026. The time on 12:08:24
15 the video monitor is 12:08 Eastern Time. The 12:08:32
16 videographer today is Parker Simpson, representing 12:08:39
17 Planet Depos, headquartered at 451 Hungerford Drive, 12:08:43
18 Suite 400, Rockville, Maryland 20850. 12:08:46
19 All parties of this video deposition are 12:08:46
20 attending remotely. Would counsel please voice 12:08:48
21 identify themselves and state whom they represent. 12:08:51
22 MR. REYNOLDS: Steve Reynolds. Along with 12:08:51

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1 me is Kevin Sprenger. We represent the patent 12:08:54
2 owner. 12:08:56
3 MR. REEVES: Nathan Reeves of Morgan, 12:08:58
4 Lewis. With me is my colleague Colin Heideman, and 12:09:01
5 we represent petitioners and the witness. 12:09:04
6 Sorry about that. 12:09:10
7 THE COURT REPORTER: And the witness? 12:09:10
8 MR. REEVES: Yes. 12:08:58
9 THE VIDEOGRAPHER: And the court reporter 12:09:12
10 today is Joan Cain, representing Planet Depos. 12:09:14
11 The witness will now be sworn, and then we 12:09:16
12 may proceed. 12:09:18
13 THE COURT REPORTER: Counsel, do you 12:09:19
14 stipulate that I may swear in the witness even 12:09:19
15 though I am not in the physical presence of the 12:09:19
16 witness? 12:09:28
17 MR. REYNOLDS: Yes. 12:09:28
18 MR. REEVES: Yes. 12:09:29
19 Whereupon, 12:09:29
20 RICHARD STERN, PH.D., 12:09:29
21 having been duly sworn under penalties of perjury by 12:09:29
22 the Notary Public, was examined and did testify as 12:09:29

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1 follows: 12:09:43
2 THE COURT REPORTER: Thank you. 12:09:43
3 Please begin. 12:09:43
4 EXAMINATION BY COUNSEL FOR THE PATENT OWNER 12:09:45
5 BY MR. REYNOLDS: 12:09:45
6 Q Good morning, Dr. Stern. 12:09:46
7 A Good morning. 12:09:48
8 Q You're familiar with -- well, let me just 12:09:49
9 start. You've taken a lot of depositions, so I 12:09:52
10 won't go over all the instructions. 12:09:55
11 Is there any reason you can't give full and 12:09:57
12 complete and accurate testimony today? 12:09:59
13 A No, there's not. 12:10:01
14 Q Do you have anything in the room with you, 12:10:03
15 in terms of paper, a phone, or computer, other than 12:10:06
16 the computer you're speaking through right now? 12:10:09
17 A No, I do not. 12:10:11
18 Q Are you familiar with the concept of a 12:10:13
19 person of ordinary skill in the art? 12:10:15
20 A Yes. 12:10:19
21 Q And can we call them a POSITA for short? 12:10:19
22 A Yes. 12:10:23

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1 Q And I believe you analyzed, in this case, a 12:10:25
2 POSITA at the time of 2018, right? 12:10:30
3 MR. REEVES: Objection. Form. 12:10:34
4 THE WITNESS: That's correct. 12:10:36
5 BY MR. REYNOLDS: 12:10:37
6 Q Okay. So I'd like to go back to 2018 for a 12:10:38
7 moment. 12:10:42
8 How many ways would a POSITA have known to 12:10:44
9 design a device to determine whether input speech 12:10:46
10 was a whisper by using a threshold in 2018? 12:10:49
11 MR. REEVES: Objection. Form. Calls for 12:10:55
12 speculation. Assumes facts. 12:10:58
13 THE WITNESS: I can think of at least two 12:11:03
14 or three. 12:11:05
15 BY MR. REYNOLDS: 12:11:05
16 Q Okay. Can you tell me what those are? 12:11:06
17 A Well, detecting a whisper, you are looking 12:11:08
18 for the detection of glottal pulses, which are the 12:11:15
19 periodic pulses created by your larynx, so you're 12:11:19
20 looking for detection of periodic components. There 12:11:24
21 are multiple ways of doing that. 12:11:27
22 The most common way of doing that is to 12:11:28

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1 perform what's known as an autocorrelation function 12:11:31
2 of the input in time, which involves multiplying the 12:11:34
3 input by itself time delayed and integrated in the 12:11:37
4 product. Looking for the maximum of that function 12:11:42
5 is a function of the time delay. Beyond zero time 12:11:46
6 delay will give you an indication of the likelihood 12:11:51
7 of having a whisper or not. 12:11:56
8 A second way would be to perform a cepstral 12:11:58
9 analysis. Cepstrum in this context is the inverse 12:12:01
10 Fourier transform of the log of the magnitude of the 12:12:09
11 Fourier transform. That cepstrum will indicate a 12:12:11
12 pulse at the time, and the horizontal axis would be 12:12:15
13 time corresponding to the fundamental period. 12:12:23
14 So those are two ways. 12:12:26
15 Q Can you please spell the word -- 12:12:27
16 A Cepstrum? 12:12:36
17 Q -- I think it was GO something pulses. 12:12:37
18 A Oh, glottal, G-L-O-T-T-A-L. That's the 12:12:41
19 technical word for the pulses that are created by 12:12:48
20 your vocal folds, or more commonly, vocal cords. 12:12:50
21 Q Understood. Would you please spell the 12:13:04
22 term something cepstral analysis, as best you can 12:13:07

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1 for the court reporter? 12:13:11
2 A No. It's easy. 12:13:12
3 So the noun is cepstrum, C-E-P-S-T-R-U-M, 12:13:16
4 and that's really just spectrum with the phonemes 12:13:22
5 interchanged. And the adjective form would be 12:13:28
6 cepstral analysis, C-E-P-S-T-R-A-L, again, spectral 12:13:30
7 with the phonemes interchanged. Many people call it 12:13:37
8 cepstral analysis, but that's incorrect, the origin 12:13:41
9 of the word. 12:13:48
10 Q How would -- how many ways would a POSITA 12:13:48
11 have known to use some sort of threshold in 12:13:51
12 connection with the glottal pulses that you 12:13:55
13 mentioned? 12:13:59
14 MR. REEVES: Objection. Form. Calls for 12:14:00
15 speculation. 12:14:06
16 THE WITNESS: Well, in all cases, both the 12:14:06
17 autocorrelation function that I described for using 12:14:13
18 the autocorrelation method -- 12:14:15
19 THE COURT REPORTER: What's the 12:14:15
20 correlation? I'm sorry. I missed that. 12:14:16
21 THE WITNESS: Autocorrelation, A-U-T-O. 12:14:19
22 THE COURT REPORTER: The first one. The 12:14:24

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first one. 12:14:25

THE WITNESS: That's what it was, A-U-T-O, 12:14:26
hyphen, correlation. Sometimes it shows up without 12:14:29
the hyphen. 12:14:32

BY MR. REYNOLDS: 12:14:34

Q Okay. I'll repeat my question just so 12:14:37
we're clear. 12:14:39

How many ways would a POSITA have known to 12:14:40
use some sort of threshold in connection with that 12:14:42
autocorrelation? 12:14:47

MR. REEVES: Same objections. 12:14:48

THE WITNESS: The two methods that I just 12:14:51
described all require -- I'm sorry. The two methods 12:14:53
require the use of a threshold, as would all, 12:15:00
because we're doing a measurement on something 12:15:04
that's continuous, and classifying it into discrete 12:15:06
categories, two categories in this case, whisper or 12:15:11
no whisper. So normally that's done by comparing to 12:15:15
a threshold. 12:15:20

In the first case, the peak of the 12:15:22
autocorrelation function, we are -- we would be 12:15:28
looking at the value of the autocorrelation function 12:15:31

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1 at the time lag corresponding to the fundamental 12:15:39
2 frequency of vibration. That's the frequency at 12:15:47
3 which you talk, minus around 100 hertz. You look at 12:15:53
4 that peak and you declare whether it is above or 12:16:01
5 below a face value. 12:16:04
6 Normally you would want to normalize that 12:16:06
7 value according to the value of that function and 12:16:13
8 zero lag, which corresponds to the overall amount of 12:16:15
9 power. If you talk louder, the value of the 12:16:18
10 threshold would be greater, vice-versa. 12:16:22
11 In the case of the cepstral analysis, 12:16:26
12 again, you would be comparing the value of cepstrum, 12:16:30
13 which is the function that I described previously, 12:16:36
14 to, again, a value. But in both cases, you're 12:16:39
15 looking at the threshold and that threshold will 12:16:43
16 also vary depending on how loud or how quiet 12:16:47
17 individual's talking. 12:16:53
18 BY MR. REYNOLDS: 12:17:00
19 Q Would the -- all the thresholds have been 12:17:00
20 the same in all of the cases you just mentioned? 12:17:02
21 MR. REEVES: Objection. Form. Assumes 12:17:06
22 facts. Lacks foundation. Calls for speculation. 12:17:08

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1 THE WITNESS: Not at all. The thresholds 12:17:12
2 are measuring two different things, and in two 12:17:15
3 different domains for that matter, and in all cases, 12:17:20
4 as I've stated, the actual absolute value would 12:17:29
5 depend on the context. It would depend on, among 12:17:32
6 other things, the overall power with which the 12:17:36
7 person talks. 12:17:39
8 You would want the person to -- you would 12:17:40
9 want the threshold to be greater if a person is 12:17:41
10 talking loudly than if the person is talking 12:17:43
11 quietly. 12:17:46
12 BY MR. REYNOLDS: 12:17:50
13 Q To be more specific, I'm talking about the 12:17:50
14 nature of the threshold that's incorporated into the 12:17:52
15 logic used to make those measurements. Would those 12:17:54
16 thresholds or the variables that contain the 12:17:58
17 thresholds all be the same? 12:18:01
18 MR. REEVES: Objection. Form. Calls for 12:18:04
19 speculation. Asked and answered. 12:18:06
20 THE WITNESS: As I said a moment ago, the 12:18:11
21 numerical value of the threshold would not be 12:18:12
22 constant. It would depend on the overall loudness 12:18:15

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1 or softness. 12:18:18
2 BY MR. REYNOLDS: 12:18:23
3 Q Would the units of all the thresholds in 12:18:23
4 any device that a POSITA would have known about in 12:18:26
5 2018 be the same? 12:18:29
6 MR. REEVES: Objection. Form. Calls for 12:18:32
7 speculation. Scope. 12:18:37
8 THE WITNESS: I think in the declaration -- 12:18:38
9 and I'll point you to the spot. This would be in 12:18:42
10 the reply declaration for the '675 patent, in the 12:18:49
11 discussion concerning the proposed modification of 12:18:55
12 claim 5 of the '675 patent. 12:18:58
13 Okay. I apologize for the delay. I was 12:20:32
14 looking for a specific place in my report, and I'm 12:20:34
15 looking at paragraph 45 in the reply declaration for 12:20:38
16 the '675 patent, and what I state there is that -- 12:20:43
17 this is concerning the threshold to which we -- 12:20:50
18 which we're discussing: "I note that a person of 12:20:53
19 ordinary skill in the art would have understood 12:20:57
20 'peak frequency' to mean the frequency at which the 12:20:58
21 energy, power, intensity, or amplitude (which are 12:21:02
22 equivalent measures in this context) is maximum." 12:21:07

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1 So these are alternate ways of measuring 12:21:12
2 basically the same thing, which is how much stuff do 12:21:15
3 you have at a particular frequency. 12:21:20
4 BY MR. REYNOLDS: 12:21:28
5 Q How does that relate to whether all 12:21:28
6 thresholds in 2018 would have had the same units? 12:21:29
7 MR. REEVES: Objection. Form. 12:21:33
8 THE WITNESS: Well, it depends on how you 12:21:39
9 do the measurement. 12:21:41
10 The -- normally, energy, power, and 12:21:42
11 intensity would be proportional to the square of the 12:21:48
12 amplitude. The amplitude would be measured in volts 12:21:51
13 if you're measuring something that's coming -- 12:21:57
14 coming into a loudspeaker, or it could be measured 12:22:00
15 in units of air pressure and things like Newtons per 12:22:03
16 square meter if you're looking at the input of a 12:22:09
17 microphone or the input to a microphone, and the 12:22:12
18 energy, power, or intensity would be the square of 12:22:19
19 those units. 12:22:24
20 Now, people in the -- doing work in audio, 12:22:26
21 like myself, commonly use decibels, which converts 12:22:33
22 all of those units to the same thing, and that's 12:22:38

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1 done because the amplitude is proportional -- the -- 12:22:42
2 for looking at amplitude measurements, the decibels 12:22:47
3 would be proportional to 20 times the logs of the 12:22:50
4 base ten of the amplitude for the other three 12:22:57
5 things, the reading in decibels would be 12:23:02
6 proportional to ten times the log to the base ten. 12:23:04
7 And since the square operation doubles the 12:23:07
8 log quantity, you -- the same relative -- 12:23:10
9 whatever -- along any of those dimensions would give 12:23:17
10 rise to the same increase or decrease in decibels. 12:23:21
11 BY MR. REYNOLDS: 12:23:27
12 Q You started your answer by saying: "Well, 12:23:27
13 it depends on how you do the measurement." 12:23:31
14 Which measurement are you talking about? 12:23:33
15 A Well, you were asking about the measurement 12:23:35
16 that you obtained in order to test the result of 12:23:45
17 that measurement against the threshold. You can 12:23:48
18 measure either the amplitude or any of the -- any of 12:23:50
19 the other three things, which, as I indicated, are 12:23:55
20 proportional to the square of the amplitude. 12:23:58
21 Q How many ways would a POSITA have known to 12:24:06
22 do that measurement? 12:24:08

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1 MR. REEVES: Objection. Form. Calls for 12:24:09
2 speculation. Outside the scope. 12:24:11
3 THE WITNESS: There are multiple ways. 12:24:17
4 Depends on where you take the measurement. 12:24:19
5 If you use the microphone, then you're 12:24:21
6 measuring air pressure. If you're measuring some 12:24:23
7 electrical signal, then you'll be using something 12:24:25
8 akin to a voltmeter. If you're looking at the 12:24:29
9 digital representation of something, then you'll be 12:24:31
10 looking at numbers inside a computer. 12:24:34
11 BY MR. REYNOLDS: 12:24:40
12 Q Would the use of thresholds have the same 12:24:41
13 units for each of those ways you just mentioned? 12:24:49
14 MR. REEVES: Objection. Form. Asked and 12:24:53
15 answered. Calls for speculation. 12:24:54
16 THE WITNESS: No. As I said, in general, 12:24:55
17 if you're looking at the raw units, like volts, 12:24:57
18 and -- versus power, which would be watts, they 12:25:03
19 would be different units. If you were converting 12:25:07
20 everything to decibels, they would be the same unit, 12:25:09
21 but it all depends. 12:25:13
22 BY MR. REYNOLDS: 12:25:17

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1 Q You said in general, but I'm interested in 12:25:17
2 the entire universe of possibilities. How many 12:25:19
3 possibilities would a POSITA have known, in terms of 12:25:23
4 which units to use, when employing a threshold? 12:25:28
5 MR. REEVES: Objection. Form. Calls for 12:25:34
6 speculation. Outside the scope. 12:25:35
7 THE WITNESS: I think I've already answered 12:25:37
8 that question. There are as many units as you have 12:25:38
9 ways to make the measurement. You know, I've talked 12:25:44
10 about volts and power and the conversion of both of 12:25:49
11 those into decibels, but you could also -- there are 12:25:54
12 other things that we haven't talked about. 12:25:58
13 You could look at current running through a 12:26:00
14 resistor carrying the same signal, which would be 12:26:03
15 proportional. You could look at charge on a device. 12:26:07
16 There's an unlimited number of different ways. 12:26:10
17 BY MR. REYNOLDS: 12:26:22
18 Q How many ways was there to write the logic 12:26:22
19 that would make a determination based on the 12:26:24
20 threshold? 12:26:26
21 MR. REEVES: Objection. Form. Calls for 12:26:28
22 speculation. Outside the scope. 12:26:31

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1 THE WITNESS: In terms of doing the 12:26:36
2 threshold information -- I'm sorry -- the -- the 12:26:38
3 threshold determination, you have a signal coming 12:26:43
4 in, measured and described in the form of your 12:26:48
5 choosing, and it's compared to a fixed number that's 12:26:50
6 also in units of the same form as the input. 12:26:57
7 BY MR. REYNOLDS: 12:27:15
8 Q I'm trying to focus more on the logic or 12:27:19
9 the source code or the electrical processes that are 12:27:21
10 applied to the threshold once a value is measured 12:27:23
11 and -- and whether it's compared to the threshold or 12:27:30
12 some other way. How many different ways were there 12:27:34
13 to use the threshold as part of that process? 12:27:38
14 MR. REEVES: Same objections. 12:27:45
15 THE WITNESS: Sorry. 12:27:45
16 The logic is very simple. You have an 12:27:46
17 input, you have a fixed number, and you asked the 12:27:48
18 question: Is the input greater to -- greater than, 12:27:55
19 rather, or less than the value of the threshold? 12:27:57
20 The compilation comes in the sense that the 12:28:06
21 value of the threshold, if you implement this 12:28:08
22 correctly, is going to be situational. The way in 12:28:11

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1 which you obtain the input will vary depending on 12:28:18
2 the application. 12:28:22
3 BY MR. REYNOLDS: 12:28:25
4 Q How many applications were there in 2018? 12:28:25
5 MR. REEVES: Objection. Form. Calls for 12:28:28
6 speculation. Outside the scope. 12:28:29
7 THE WITNESS: Lots of different 12:28:36
8 applications. 2018, any speech recognition 12:28:37
9 application, you might cluster the applications into 12:28:41
10 a smallish number of categories, such as speaker 12:28:51
11 recognition, language identification, speech 12:28:56
12 recognition, and so forth. But there are many, many 12:29:01
13 different ways of implementing those black box 12:29:05
14 functionalities, and I'm not going to attempt to 12:29:09
15 enumerate that. Every company, every laboratory 12:29:13
16 would have its own. 12:29:17
17 BY MR. REYNOLDS: 12:29:33
18 Q I'm not sure I'm going to get this right, 12:29:36
19 so just, you know, correct me if I'm wrong, but I 12:29:39
20 think you described that a POSITA would have 12:29:41
21 compared a value to the value of some measured 12:29:42
22 variable to the value of a threshold. I think you 12:29:47

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1 described that as the simple part of the logic; is 12:29:50
2 that right? 12:29:53
3 A That's correct. 12:29:53
4 MR. REEVES: Objection. Form, to the 12:29:54
5 extent it misstates testimony. Outside the scope. 12:29:57
6 BY MR. REYNOLDS: 12:30:05
7 Q Would the measured value in the threshold 12:30:05
8 always have to have the same units? 12:30:07
9 A Yes. 12:30:09
10 MR. REEVES: Same objections. 12:30:09
11 THE WITNESS: Yes. 12:30:12
12 BY MR. REYNOLDS: 12:30:13
13 Q It would not have been possible for a 12:30:15
14 POSITA to create any system in which a value is 12:30:16
15 compared to a threshold where the value had a 12:30:20
16 different unit than the threshold? 12:30:23
17 MR. REEVES: Objection. Form, outside the 12:30:25
18 scope, asked and answered, and calls for 12:30:28
19 speculation. 12:30:31
20 THE WITNESS: It would be meaningless. 12:30:31
21 That would be the classic apples-to-oranges 12:30:32
22 comparison. 12:30:45

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1 BY MR. REYNOLDS: 12:30:45
2 Q I think we might have gone a little too 12:30:46
3 quickly through the instructions part. So I used 12:30:48
4 the word "paper" when I asked if you had anything in 12:30:51
5 front of you because some lawyers sometimes refer to 12:30:55
6 documents as paper. Looks like you have your reply 12:30:59
7 brief or -- I'm sorry -- your reply declaration in 12:31:02
8 front you, right? 12:31:04
9 A I do. 12:31:05
10 Q Okay. 12:31:05
11 A I should have -- it was placed in front of 12:31:08
12 me. I have in front of me the two reply 12:31:09
13 declarations that were written. 12:31:13
14 Q Okay. 12:31:14
15 A That's all I have. 12:31:15
16 Q Anything else in terms of -- in terms of 12:31:15
17 documents? 12:31:17
18 A In terms of documents, no. There's a 12:31:18
19 watch, a pair of glasses, a Coca-Cola can, and a 12:31:21
20 glass containing a partially consumed beverage. 12:31:26
21 Q Appreciate that. 12:31:29
22 A Too much information, maybe. 12:31:32

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1 Q In 2018 would a POSITA have known how to 12:31:32
2 classify voices without basing the classification on 12:31:43
3 distance? 12:31:47
4 MR. REEVES: Objection. Form. Calls for 12:31:49
5 speculation. Outside the scope. 12:31:50
6 THE WITNESS: There are many ways of 12:31:53
7 classifying voices. Classification based on 12:31:57
8 distance is one of them. 12:32:00
9 BY MR. REYNOLDS: 12:32:01
10 Q What's one way a POSITA would have done 12:32:01
11 it -- been able to do it without basing the 12:32:03
12 classification on distance? 12:32:06
13 MR. REEVES: Objection. Calls for 12:32:09
14 speculation. Outside the scope. 12:32:10
15 THE WITNESS: You could classify voices 12:32:13
16 according to whether the voice is believed to be 12:32:16
17 coming from a male or a female. That would be based 12:32:18
18 on fundamental frequency estimation, which, of 12:32:21
19 course, isn't always correct, but you can tell more 12:32:24
20 time -- more often than not. 12:32:27
21 BY MR. REYNOLDS: 12:32:35
22 Q In 2018 would a POSITA have known how to 12:32:35

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1 classify voices using volume without basing the 12:32:39
2 classification on distance? 12:32:42
3 MR. REEVES: Objection. Form. 12:32:44
4 THE WITNESS: Yes. 12:32:49
5 BY MR. REYNOLDS: 12:32:49
6 Q How would that be done? 12:32:50
7 A Well, you would measure the average energy, 12:32:50
8 intensity, power, amplitude -- any of those -- and 12:32:57
9 compare that with the threshold, or -- or not and 12:33:02
10 use that as a means for classification. 12:33:08
11 Q But wouldn't those values change if the 12:33:15
12 user's distance changed? 12:33:17
13 A Of course. 12:33:20
14 Q So how would a POSITA then have made a 12:33:20
15 classification using volume, but not distance? 12:33:26
16 MR. REEVES: Objection. Form. Calls for 12:33:31
17 speculation. Outside the scope. 12:33:36
18 THE WITNESS: There are other ways of 12:33:43
19 inferring distance beyond volume and, for that 12:33:44
20 matter, beyond a specific distance-sensing device, 12:33:53
21 as disclosed by some of the prior art that we cite 12:34:00
22 in, you know, my documents. 12:34:03

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1 You can listen to how reverberant speech 12:34:09
2 sounds and at least within a given context, if that 12:34:15
3 remains constant over a period of time, you can look 12:34:21
4 for increases and decreases of the power, energy, 12:34:23
5 intensity, amplitude measurements you obtain to 12:34:30
6 estimate at least relative loudness, relative 12:34:35
7 volume. 12:34:38
8 BY MR. REYNOLDS: 12:34:43
9 Q In that instance, how would a POSITA have 12:34:43
10 made sure that while measuring power, energy, 12:34:46
11 intensity, amplitude measurements were not measuring 12:34:49
12 variables that also responded to changes in 12:34:53
13 distance? 12:34:56
14 MR. REEVES: Objection. Form. Calls for 12:34:57
15 speculation. Outside the scope. 12:35:00
16 THE WITNESS: You'd never be sure. That's 12:35:01
17 a difficult problem even today. Voice activity 12:35:04
18 detection is an important problem and it's 12:35:07
19 difficult, in part, because environmental factors 12:35:11
20 such as background noise and other interferent 12:35:16
21 speakers make an unambiguous determination 12:35:21
22 difficult. 12:35:25

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1 BY MR. REYNOLDS: 12:35:33
2 Q So you're saying that if we looked at any 12:35:33
3 device or paper or specification published or 12:35:36
4 created in 2018 that analyzed some form of volume 12:35:43
5 when classifying voice, we could never be sure 12:35:49
6 whether it's based on distance or not? 12:35:52
7 MR. REEVES: Objection. Form, to the 12:35:56
8 extent it misstates testimony. Calls for 12:35:57
9 speculation. Outside the scope. 12:36:03
10 THE WITNESS: As you heard, I didn't say 12:36:04
11 that. You would be able to determine how the 12:36:05
12 classification was made based on how the system was 12:36:09
13 described. Normally that would be disclosed in a 12:36:13
14 research paper or technical document. All you asked 12:36:18
15 me before was: Are there other ways of doing it? 12:36:23
16 BY MR. REYNOLDS: 12:36:28
17 Q What's one way we -- a POSITA would have 12:36:29
18 been able to analyze a system that measured volume 12:36:32
19 when making a classification to determine whether or 12:36:39
20 not the system also used distance when making that 12:36:43
21 classification? 12:36:47
22 MR. REEVES: Objection. Form. Outside the 12:36:49

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1 scope. 12:36:52
2 THE WITNESS: I'm sorry. That's a -- I had 12:36:52
3 trouble with the question. Could you repeat it, 12:36:56
4 please? 12:36:58
5 BY MR. REYNOLDS: 12:36:58
6 Q Sure. 12:36:59
7 So let's assume a POSITA is looking at a 12:36:59
8 system. The POSITA sees that the system measures 12:37:02
9 volume and the POSITA sees that the system also 12:37:07
10 classifies voices. How would a POSITA have been 12:37:14
11 able to determine, when looking at that system, 12:37:18
12 whether the system also bases the classification on 12:37:21
13 distance or whether the system doesn't use distance 12:37:24
14 when classifying voices? 12:37:28
15 MR. REEVES: Objection. Form. Calls for 12:37:30
16 speculation. Incomplete hypothetical. Outside the 12:37:33
17 scope. 12:37:37
18 THE WITNESS: I assume I'm still supposed 12:37:37
19 to answer that nonetheless. That was part of the 12:37:39
20 instructions that you didn't read. 12:37:43
21 The system would be designed either to use 12:37:47
22 a distance sensor or not, to use an energy or 12:37:54

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1 amplitude estimation or not. That would be baked 12:37:59
2 into how the system was designed and constructed. 12:38:04
3 BY MR. REYNOLDS: 12:38:11
4 Q Well, I'm asking from the standpoint of a 12:38:12
5 POSITA that's analyzing the system, not from someone 12:38:14
6 who designed the system. 12:38:18
7 How would a POSITA have assessed that, 12:38:19
8 whether that system actually used distance or not, 12:38:21
9 when classifying the voices? 12:38:23
10 MR. REEVES: Same objections. 12:38:27
11 THE WITNESS: Typically by examining the 12:38:28
12 code that implemented the system, if it were in 12:38:30
13 hardware -- software, rather, or the physical 12:38:33
14 configuration or schematic, if it were implemented 12:38:36
15 in hardware, or in combination, which 12:38:41
16 components/which kinds of sensors were used. 12:38:46
17 BY MR. REYNOLDS: 12:38:51
18 Q What would a POSITA look for when analyzing 12:38:52
19 software or the logic in hardware components? 12:38:55
20 MR. REEVES: Same objections. 12:39:00
21 THE WITNESS: Does the system have a 12:39:03
22 distance sensor explicitly? Does the system have a 12:39:05

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1 microphone explicitly or equivalent device? How 12:39:09
2 many? And then you can go beyond that. Once again, 12:39:15
3 look at the code or the schematic of what those 12:39:21
4 components contain. 12:39:27
5 BY MR. REYNOLDS: 12:39:31
6 Q What if the system didn't have a distance 12:39:31
7 sensor, it only had a microphone? How would a 12:39:34
8 POSITA have determined whether the system was using 12:39:39
9 distance to classify voices or not? 12:39:42
10 MR. REEVES: Objection. Form. Calls for 12:39:47
11 speculation and incomplete hypothetical. Outside 12:39:48
12 the scope. 12:39:52
13 THE WITNESS: If you had two microphones, 12:39:52
14 you could estimate the time delay between the two 12:39:56
15 microphones and use that to estimate the angle of 12:39:59
16 arrival from the two, and that would give you some 12:40:08
17 information about where -- you know, through 12:40:10
18 trigonometry, where the voice source might be 12:40:14
19 located. 12:40:19
20 On the other hand, if there were nothing 12:40:21
21 but a microphone, more than likely, the -- I'm 12:40:23
22 sorry. This is terrible, but I've forgotten the -- 12:40:37

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1 the tail end of the original question. Would you 12:40:41
2 mind repeating it? 12:40:43
3 BY MR. REYNOLDS: 12:40:43
4 Q Sure. Yeah. No, not a problem. 12:40:44
5 What I'm trying to get at is how would a 12:40:47
6 POSITA have determined whether the device the POSITA 12:40:50
7 was looking at used distance in its classification 12:40:52
8 process or not. So the POSITA is looking at a 12:40:56
9 device that has one microphone and no distance 12:40:59
10 sensor. 12:41:03
11 How would a POSITA determine whether that 12:41:04
12 device or system is using distance when it 12:41:06
13 classifies voices? 12:41:09
14 MR. REEVES: Same objections. 12:41:11
15 THE WITNESS: Most likely the system would 12:41:16
16 be -- once again, are we trying to detect loudness 12:41:22
17 or -- or distance using just the single microphone? 12:41:25
18 That's the part that I've lost track of because 12:41:29
19 it's -- 12:41:32
20 BY MR. REYNOLDS: 12:41:35
21 Q Well, all we know -- I'm sorry. Go ahead. 12:41:35
22 I thought you were done. Please, go ahead. 12:41:37

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1 A You were asking how does the system -- how 12:41:41
2 do we know how the system detects something if it 12:41:45
3 just has a microphone and no additional sensors, and 12:41:49
4 I was asking what is that additional something. 12:41:52
5 Q Oh, well, the -- so we -- we have a system 12:42:00
6 with a microphone, but no distance sensor, and the 12:42:04
7 POSITA knows that the system classifies voices and 12:42:10
8 the POSITA knows that the system measures volume. 12:42:13
9 How would a POSITA have determined whether the 12:42:17
10 system also uses distance to classify voices or 12:42:18
11 whether it doesn't use distance to classify voices? 12:42:23
12 A Okay. 12:42:28
13 MR. REEVES: Objection. Form. Incomplete 12:42:29
14 hypothetical. Outside the scope. 12:42:30
15 THE WITNESS: Thank you. 12:42:32
16 As I alluded to before, more than likely 12:42:32
17 the system wouldn't use distance at all because 12:42:41
18 that's the simple way of doing it. It would base 12:42:44
19 the determination on energy and intensity, et 12:42:47
20 cetera, et cetera. 12:42:49
21 You could, again, infer some information 12:42:51
22 about distance by assessing the amount of 12:42:56

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1 reverberance in the signal coming in. Typically, 12:42:59
2 the more reverberance, the farther -- the farther 12:43:06
3 the source is from the microphone. 12:43:08
4 So nothing is absolute, but the more likely 12:43:11
5 thing would be you're not using distance at all 12:43:24
6 because it's simpler, a lot simpler. 12:43:26
7 BY MR. REYNOLDS: 12:43:29
8 Q How would a POSITA confirm that it doesn't 12:43:29
9 use distance at all? I think you said more likely, 12:43:31
10 but how would a POSITA confirm that fact? 12:43:33
11 A You would look at the code or the hardware 12:43:37
12 implementation of that code to determine what the 12:43:43
13 algorithm was. Are you assessing anything beyond 12:43:45
14 mere energy, power, amplitude, intensity, or is that 12:43:50
15 all that's being considered? 12:43:55
16 Q When you say "energy, power, amplitude, 12:44:02
17 intensity," you mean variables associated with 12:44:07
18 volume, right? 12:44:10
19 A That's correct. 12:44:11
20 Q In 2018 would a POSITA have known how to 12:44:16
21 measure distance using only volume? 12:44:19
22 MR. REEVES: Objection. Form. That calls 12:44:23

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1 for speculation. Outside the scope. 12:44:25
2 THE WITNESS: Even today, distance 12:44:29
3 measuring only volume is difficult, but not 12:44:32
4 impossible. 12:44:36
5 BY MR. REYNOLDS: 12:44:43
6 Q How would a POSITA have done it in 2018 if 12:44:44
7 it's not impossible? 12:44:46
8 MR. REEVES: Objection. Form. Calls for 12:44:48
9 speculation. Outside the scope. 12:44:49
10 THE WITNESS: Most common thing is the 12:44:54
11 estimation of how -- how reverberant the signal is, 12:45:00
12 coupled with relative intensity. With no 12:45:05
13 information at all and with no reliance at all on 12:45:12
14 volume, it's a very, very difficult problem. People 12:45:15
15 are trying to address that now, but it's much more 12:45:22
16 difficult than assessing where a source is, left, 12:45:25
17 right, up, or down. 12:45:32
18 The reason -- 12:45:36
19 BY MR. REYNOLDS: 12:45:37
20 Q I think you said -- oh, I'm sorry. I keep 12:45:37
21 doing that. 12:45:39
22 A Well, it's also -- I keep pausing. 12:45:40

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1 If you don't use volume at all, that's very 12:45:46
2 restrictive, but in general, because of the way 12:45:50
3 sound is propagated, the farther the source -- the 12:45:56
4 farther away the source is, the lower the volume of 12:45:59
5 the stuff coming in. You know, unfortunately, 12:46:04
6 that's a relative measure because that's also 12:46:08
7 affected by the loudness with which a person speaks. 12:46:10
8 Q So my question was if a POSITA in 2018 12:46:26
9 would have known how do you -- to measure distance 12:46:36
10 using only volume, not excluding volume, but only 12:46:39
11 using volume. 12:46:43
12 A That sounded like half a question. There 12:46:51
13 was an if, but what followed? 12:46:53
14 Q Sure. Let me -- let me start over. 12:46:56
15 In 2018 would a POSITA have known how to 12:46:57
16 measure distance using only volume? 12:47:02
17 MR. REEVES: Objection. Form. Calls for 12:47:05
18 speculation. Outside the scope. 12:47:07
19 THE WITNESS: That's something that a 12:47:21
20 POSITA -- a POSITA in 2026 is not going to be able 12:47:23
21 to do accurately, but it could be done using, you 12:47:27
22 know, relative volume. You'd make an estimate, but 12:47:35

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1 it wouldn't be super accurate. 12:47:38
2 BY MR. REYNOLDS: 12:47:51
3 Q You mentioned in terms of 2026. Would the 12:47:52
4 answer have been different in 2018? 12:47:54
5 A Well, I guess what I was trying to imply 12:47:56
6 was that if we can't do it in 2026, we would not 12:48:01
7 have been able to do it in 2018. 12:48:05
8 Q You mentioned using relative volume. That 12:48:11
9 would still require some sort of a priori starting 12:48:15
10 point, right? 12:48:21
11 MR. REEVES: Objection. Form. Calls for 12:48:22
12 speculation. Incomplete hypothetical. Outside the 12:48:26
13 scope. 12:48:30
14 THE WITNESS: Not necessarily. Normally, 12:48:30
15 you look at the average volume over a period of time 12:48:34
16 in the past and compare it to the present volume, 12:48:37
17 and, again, that'll give you an indication, not 12:48:42
18 without some variability, of whether you're 12:48:46
19 talking -- whether the signal is more intense or 12:48:52
20 less intense. 12:48:55
21 But that's confounded by the fact that 12:48:56
22 volume can also change when the loudness with which 12:48:58

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1 a speaker vocalizes changes as well, and that's why 12:49:03
2 this is a hard problem. 12:49:08
3 BY MR. REYNOLDS: 12:49:17
4 Q And I understand, I think, why it's a hard 12:49:17
5 problem, but what I guess I don't understand is how 12:49:20
6 it's even possible if a device gets two different 12:49:24
7 volumes and it doesn't know where the -- either the 12:49:30
8 first or second volume are located, then how can it 12:49:36
9 use just that ratio alone to make a distance 12:49:40
10 determination? 12:49:43
11 MR. REEVES: Objection. Form. Calls for 12:49:46
12 speculation. Outside the scope. 12:49:49
13 THE WITNESS: You would compare volume 12:49:57
14 measurements made over a period of time and assume 12:50:00
15 that -- or not assume, but have your algorithm make 12:50:07
16 a determination that the ones that are lower are 12:50:12
17 farther away, but as I said, and as you've 12:50:18
18 reiterated, that is confounded by the fact that the 12:50:23
19 intensity of a speaker can change. That is, the 12:50:27
20 volume of the sound emitted by the speaker could 12:50:38
21 change. 12:50:41
22 BY MR. REYNOLDS: 12:50:41

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1 Q I understand that it's confounded, but two 12:50:41
2 different changes in distance from user starting at 12:50:50
3 different starting points could show the device the 12:50:56
4 exact same change in volume, depending on how loud 12:51:01
5 each is speaking, right? 12:51:07
6 MR. REEVES: Objection. Form. Calls for 12:51:09
7 speculation. Incomplete hypothetical. Outside the 12:51:10
8 scope. 12:51:17
9 THE WITNESS: Just to make sure I can 12:51:17
10 answer this, would you mind repeating the question? 12:51:18
11 BY MR. REYNOLDS: 12:51:18
12 Q Sure. 12:51:21
13 If we have two users who start at two 12:51:22
14 different locations -- one starts very far from the 12:51:26
15 device, one starts very close to the device -- and 12:51:29
16 the device measures these two individuals at 12:51:34
17 different times, if the user very far from the 12:51:37
18 device was speaking much louder, and then later, the 12:51:43
19 user closer to the device was speaking much softer 12:51:46
20 and then both started to move, such that the volume 12:51:51
21 received at the device changed, it is possible that 12:51:55
22 the device can see the exact same starting and final 12:51:57

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1 volumes from both speakers, right? 12:52:00
2 MR. REEVES: Same objections. 12:52:04
3 THE WITNESS: That is correct. 12:52:06
4 BY MR. REYNOLDS: 12:52:07
5 Q So would there have been any way in 2018, 12:52:07
6 using just that information, to differentiate 12:52:10
7 between the two speakers? 12:52:13
8 MR. REEVES: Same objections. 12:52:17
9 THE WITNESS: I think that your question as 12:52:30
10 you're posing it unrealistically overconstrained. 12:52:33
11 You're asking me to determine whether a system could 12:52:37
12 discriminate, just paying attention to volume. 12:52:42
13 In truth, a POSITA or a well-informed 12:52:45
14 system designer would want to make use of every 12:52:52
15 aspect of the signal that's available coming in 12:52:55
16 through the microphone. I've already mentioned 12:52:59
17 reverberation. You can look for other attributes of 12:53:02
18 the speech: Is it a male or a female? Is the 12:53:05
19 location different? You can try to identify, you 12:53:09
20 know -- you know, accents. Is the person a French 12:53:17
21 speaker or Latino speaker? 12:53:22
22 So if you were truly trying to do that and 12:53:26

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1 that were an important goal of the system, using 12:53:29
2 only microphone input, then you would use more than 12:53:32
3 just volume. 12:53:35
4 BY MR. REYNOLDS: 12:53:36
5 Q But what if we didn't have a well-informed 12:53:36
6 designer and they demanded that we just use volume. 12:53:40
7 Could it be done? 12:53:45
8 A As I -- 12:53:46
9 MR. REEVES: Same objections. 12:53:48
10 THE WITNESS: As I already told you, that 12:53:49
11 would be very difficult. It's a hard problem. 12:53:51
12 You've identified the important elements, that the 12:53:53
13 relative loudness could change, based both on the 12:53:57
14 intrinsic force with which the user vocalizes, and 12:54:05
15 the distance between the speaker and the -- and the 12:54:11
16 device. 12:54:15
17 BY MR. REYNOLDS: 12:54:18
18 Q So you say, "very difficult," but you're 12:54:18
19 not willing to say, in my unrealistically 12:54:23
20 overconstrained hypothetical, that it would be 12:54:28
21 possible? 12:54:30
22 MR. REEVES: Objection. Form. Asked and 12:54:31

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1 answered. Calls for speculation. Incomplete 12:54:33
2 hypothetical. Outside the scope. 12:54:35
3 THE WITNESS: Not impossible if you're 12:54:43
4 looking -- if you take one measurement and have one 12:54:45
5 number coming in, you'd not be able to do it, but by 12:54:48
6 looking at sequences of measurements over time, you 12:54:53
7 might be able to do -- you might be able to get some 12:54:57
8 performance out of that. 12:55:02
9 And as I said, it's a hard problem. A 12:55:03
10 POSITA today would have a hard time with it, but 12:55:10
11 everybody recognizes that. Nobody tries to do it 12:55:13
12 that way. 12:55:16
13 BY MR. REYNOLDS: 12:55:19
14 Q How would looking at sequences of 12:55:19
15 measurements over time assist in allowing one to 12:55:21
16 determine distance, where just looking at a single 12:55:28
17 measurement they wouldn't be able to? 12:55:31
18 MR. REEVES: Objection. Form. Outside the 12:55:34
19 scope. 12:55:38
20 THE WITNESS: First of all, I'm assuming 12:55:38
21 there's only one person talking at a time. 12:55:39
22 Occasionally you've raised the possibility of two 12:55:44

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1 speakers, and that confounds the problem, but I 12:55:46
2 don't believe that was the question -- the problem 12:55:49
3 you were originally addressing. 12:55:51
4 Sequences over time would enable you to -- 12:55:54
5 again, with the assumption that the person is 12:56:03
6 speaking with more or less constant vocal effort, 12:56:06
7 but comparing that, that would enable you to infer, 12:56:11
8 or the machine to infer, whether the user is 12:56:15
9 becoming closer or -- or farther from the device. 12:56:18
10 BY MR. REYNOLDS: 12:56:29
11 Q I'm sorry. Go ahead. 12:56:29
12 A Oh, yeah. I was debating whether to add 12:56:31
13 this, but I will anyhow. 12:56:34
14 That will still make rendering an absolute 12:56:40
15 determination, you know, difficult, but that's 12:56:42
16 always a problem. 12:56:47
17 MR. REEVES: Counsel, would now be a good 12:57:02
18 time for a break? 12:57:04
19 MR. REYNOLDS: Sure. Five? 12:57:06
20 MR. REEVES: Sure. 12:57:09
21 THE VIDEOGRAPHER: Okay. Stand by. 12:57:11
22 Going off the record. The time is 12:57. 12:57:12

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1 (Recess.) 12:57:15
2 THE VIDEOGRAPHER: Back on the record. The 13:02:39
3 time is 13:02. 13:02:41
4 BY MR. REYNOLDS: 13:02:43
5 Q All right. Dr. Stern, I apologize for keep 13:02:44
6 coming back to this, but I just want to try to put a 13:02:47
7 finer point on it, if for no other reason than I'm 13:02:50
8 just having a tough time myself. 13:02:54
9 Let's set up a hypothetical where we have a 13:02:57
10 user that's ten feet from a device that's speaking 13:03:00
11 at ten decibels. 13:03:03
12 A Okay. 13:03:06
13 Q If that user steps one foot closer to the 13:03:06
14 device, speaking at the same ten decibels, the 13:03:09
15 device is going to register a change in volume, 13:03:13
16 right? 13:03:16
17 MR. REEVES: Objection. Form. Calls for 13:03:18
18 speculation and incomplete hypothetical. Outside 13:03:21
19 the scope. 13:03:23
20 THE WITNESS: That's correct. 13:03:23
21 BY MR. REYNOLDS: 13:03:27
22 Q Now, if another user was a hundred feet 13:03:27

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1 from the device speaking at ten decibels, there is a 13:03:30
2 distance at which that user could move closer to the 13:03:38
3 device and still speak at a hundred decibels, for 13:03:41
4 which the device would measure the exact same change 13:03:47
5 as with the first user, right? 13:03:50
6 MR. REEVES: Same objections. 13:03:54
7 THE WITNESS: That's correct, and the 13:03:54
8 distance would be the same distance as the first 13:03:56
9 user was at. 13:03:59
10 BY MR. REYNOLDS: 13:04:04
11 Q And that's because volume decreases with 13:04:04
12 the square of distance and decibels are measured on 13:04:06
13 a logarithmic scale. 13:04:09
14 Is that roughly why? 13:04:14
15 A No. That's correct. 13:04:15
16 Q Okay. So -- 13:04:17
17 A And it's actually amplitude or pressure 13:04:18
18 that decreases with the square of distance, but it 13:04:21
19 doesn't matter. The principles are correct as you 13:04:24
20 state them. 13:04:27
21 Q Understood. I'm an aerospace engineer, so 13:04:27
22 I will have to let my school know that I made that 13:04:30

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1 mistake. 13:04:32
2 A No, you don't. 13:04:34
3 Q So two users at two different devices cause 13:04:37
4 the same decrease in volume by moving, and so I 13:04:42
5 guess that's what leads me to believe that it might 13:04:46
6 be impossible for a device to use just volume to 13:04:48
7 determine distance because I don't see how it would 13:04:51
8 have been able to differentiate between the -- those 13:04:54
9 two users. 13:04:58
10 Is there a way a device -- or how would a 13:05:01
11 device -- or how would a POSITA in 2018 been able to 13:05:06
12 program a device to distinguish between the two 13:05:08
13 users in that hypothetical? 13:05:11
14 MR. REEVES: Objection. Form. Calls for 13:05:13
15 speculation and incomplete hypothetical. Outside 13:05:14
16 the scope. 13:05:21
17 THE WITNESS: Just working from the audio, 13:05:21
18 there are other means by which you could attempt to 13:05:23
19 identify which individual it was. These are all of 13:05:27
20 the various things that go into speaker 13:05:31
21 identification. 13:05:33
22 BY MR. REYNOLDS: 13:05:38

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1 Q What's one means by which you could have 13:05:39
2 done so just using the volume measurements? 13:05:41
3 MR. REEVES: Objection. Form. Calls for 13:05:45
4 speculation. Outside the scope. 13:05:46
5 THE WITNESS: Just using the value 13:05:51
6 measurement -- the volume measurements, no. But in 13:05:53
7 the previous question that I responded to, there 13:05:56
8 wasn't a volume measurement constraint in the 13:05:59
9 question. So I answered using the more general 13:06:01
10 analysis. 13:06:07
11 BY MR. REYNOLDS: 13:06:07
12 Q Okay. But just using the volume, a POSITA 13:06:08
13 would not have been able to program a device that 13:06:11
14 could distinguish between the two users in that 13:06:13
15 hypothetical, in terms of distance? 13:06:17
16 MR. REEVES: Same objections. 13:06:21
17 THE WITNESS: Well, if I remember how you 13:06:23
18 constructed the situation, the first user was at a 13:06:24
19 distance -- some distance, speaking at, shall we 13:06:30
20 say, 10 dB SPL and the second user was also at the 13:06:36
21 same distance speaking at 10 dB SPL, and under those 13:06:42
22 circumstances, you would not be able to distinguish 13:06:49

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1 them, but, in fact, they were speaking from the same 13:06:52
2 distance. 13:06:56
3 BY MR. REYNOLDS: 13:06:59
4 Q You said 10 dB SPI or SPL? 13:07:00
5 A SPL. That's for sound pressure level. 13:07:04
6 Q Okay. The hypothetical I set up was one 13:07:07
7 user was at ten feet and the other user was at a 13:07:11
8 hundred feet beginning point, and then they each 13:07:14
9 moved enough of a distance that the device 13:07:16
10 registered the same change in volume. 13:07:21
11 In that circumstance, would it be possible 13:07:26
12 to differentiate between -- and the users did so at 13:07:28
13 different times in that circumstance. 13:07:31
14 A You mean -- 13:07:34
15 Q I'm sorry. Go ahead. 13:07:35
16 A Object? 13:07:37
17 MR. REEVES: Yeah. I guess, to the extent 13:07:39
18 there's a question here, objection. Form. Calls 13:07:41
19 for speculation. Outside the scope. 13:07:45
20 THE WITNESS: Just being very careful, you 13:07:51
21 said first speaker starts at, you know, close to, 13:07:53
22 say, ten feet at ten -- 10 dB SPL is just absolute. 13:07:56

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1 Second user starts at a hundred feet, also speaking 13:08:04
2 at 10 dB SPL -- that's just the units for decibels 13:08:09
3 that specifies the reference -- and at that point 13:08:19
4 everything is constrained. 13:08:22
5 Indeed, the system would recognize that the 13:08:26
6 closer speaker would come in as louder, more 13:08:29
7 intense, and you'd be -- you'd be able to identify 13:08:32
8 the -- which individual was speaking. 13:08:37
9 Now, beyond that, I kind of got lost 13:08:40
10 because I think that you were interchanging change 13:08:47
11 in volume with volume, and I wasn't sure which was 13:08:49
12 which. 13:08:53
13 But just moving ahead for a moment, you 13:08:53
14 were suggesting that one of them could change his or 13:08:58
15 her position, say the far one moves closer, and if 13:09:01
16 he or she continues to speak at 10 dB, then the 13:09:06
17 point at which the two volumes become -- the two 13:09:12
18 measurements become equal should, from the physics, 13:09:16
19 be the point at which they're at equal distance. 13:09:20
20 BY MR. REYNOLDS: 13:09:20
21 Q Okay. I understand the confusion and how I 13:09:53
22 was not -- well, let me start over. 13:09:56

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1 Let's assume that the speaker at ten feet 13:10:00
2 speaks at a volume of, say, 10 decibels, but that 13:10:07
3 the speaker at a hundred feet speaks at a volume, 13:10:11
4 perhaps, 30 decibels, for which the device would 13:10:14
5 receive the same volume of both speakers. 13:10:18
6 Does that make sense if we make that 13:10:21
7 assumption? 13:10:23
8 A Yeah. I'm not sure the right number's 30 13:10:23
9 decibels, but there will be some louder intensity 13:10:25
10 with which the farther speaker would speak that 13:10:30
11 would result in the volume measurement, shall we 13:10:33
12 say, being the same for the two speakers. 13:10:39
13 Q Okay. So in that hypothetical, if both 13:10:45
14 users speaking to the device at separate times moved 13:10:48
15 distances toward the device such that the ending 13:10:55
16 volume of their -- the volume at their second 13:10:59
17 position was also received to be the same at the 13:11:02
18 device -- in that instance, could the device 13:11:05
19 determine -- distinguish between the two -- the 13:11:09
20 distance of the two users? 13:11:11
21 MR. REEVES: Objection. Form. Calls for 13:11:14
22 speculation. Incomplete hypothetical. Outside the 13:11:16

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1 scope. 13:11:25
2 THE WITNESS: Well, let's back up a step. 13:11:25
3 The -- if you knew exactly what the 13:11:28
4 intensity was from the speech coming from the 13:11:38
5 speakers, then, in principle -- and if your 13:11:44
6 microphone were absolutely calibrated, which 13:11:51
7 normally it wouldn't be, but if it were, then in 13:11:53
8 principle, you should be able to infer the -- the 13:11:58
9 distance using calculations related to the inverse 13:12:02
10 square law that you cited. The acoustics have an 13:12:08
11 equation that tell you what the number should be. 13:12:15
12 I'm not going to attempt to calculate it, but we 13:12:19
13 don't need to do that. 13:12:22
14 The way you set the problem up originally 13:12:31
15 is that you have a speaker at ten feet, shall we 13:12:34
16 say, and at a hundred feet, another one, and the 13:12:39
17 first one speaks at 10 dB and the second one speaks 13:12:43
18 at some louder volume such that the signal receiving 13:12:46
19 by the microphone is the same volume. 13:12:52
20 Even under those circumstances, before we 13:12:54
21 start moving the speakers around, you're not -- 13:12:57
22 unless the system knows the intensity of each of the 13:13:02

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1 two speakers, you're not going to be able to infer 13:13:07
2 the distance. You're just going to know that you 13:13:10
3 have two numbers and that they're the same number. 13:13:14
4 BY MR. REYNOLDS: 13:13:14
5 Q Okay. And then if the device can't infer 13:13:24
6 if the distance from the starting point, then if 13:13:26
7 there's a sequence of volumes measured, how would 13:13:31
8 the device be able to infer the distance using 13:13:34
9 additional volume measurements? 13:13:38
10 A Well, it would be -- 13:13:40
11 MR. REEVES: Sorry. 13:13:42
12 Objection. Form. Calls for speculation. 13:13:43
13 Outside the scope. 13:13:46
14 THE WITNESS: It would not. It would be 13:13:58
15 able to infer that you're moving closer or moving 13:14:00
16 farther away. 13:14:03
17 BY MR. REYNOLDS: 13:14:41
18 Q All right. I have put your reply 13:14:41
19 declaration into the Chat. I understand you have it 13:14:43
20 in front of you, but would you take a moment to look 13:14:46
21 at the one in the Chat and just confirm that they're 13:14:48
22 the same? 13:14:50

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1 A How do I access the Chat here? Looks like 13:15:10
2 it's different. I'm clicking on the icon that says: 13:15:14
3 "Chat," on the bottom. Oh, have to have a 13:15:19
4 professional. 13:15:31
5 MR. REEVES: Can we go off the record for a 13:15:44
6 minute and just fix this technical issue? 13:15:46
7 MR. REYNOLDS: Yeah. 13:15:50
8 THE WITNESS: Yeah, I think what's going on 13:15:51
9 is I have to download it. 13:15:54
10 THE VIDEOGRAPHER: Stand by. 13:15:55
11 Going off the record. The time is 13:15. 13:15:56
12 (Recess.) 13:16:01
13 THE VIDEOGRAPHER: Back on the record. The 13:17:20
14 time is 13:17. 13:17:21
15 BY MR. REYNOLDS: 13:17:23
16 Q Dr. Stern, is the exhibit I put into the 13:17:24
17 Chat the same as the reply declaration of Richard 13:17:26
18 Stern, Ph.D. that you have in front of you? 13:17:34
19 A I only looked at a few pages, but it looks 13:17:37
20 like it's the same. 13:17:40
21 Q They're both marked as Exhibit 1202 on the 13:17:41
22 front? 13:17:43

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1 A Correct. 13:17:44
2 Q All right. I'd like you to look at 13:17:47
3 paragraph 5 of your declaration. 13:17:49
4 A Okay. 13:18:01
5 Q Is it your opinion that the voice 13:18:07
6 classifying unit recited in the claims of the six -- 13:18:08
7 '675 patent may classify the user's voice based 13:18:12
8 solely on user-to-device distance? 13:18:17
9 A As I say in the declaration, beginning on 13:18:44
10 paragraph 6: "The '675 patent...confirms my opinion 13:18:48
11 that the classification can be based solely on the 13:18:53
12 measured distance." 13:18:55
13 In other words, you don't need anything 13:18:57
14 else besides distance. 13:18:59
15 Q And in paragraph 5, you rely on paragraph 13:19:01
16 59 of your opening declaration, right? 13:19:08
17 A That appears to be the case. I don't have 13:19:19
18 a copy of the opening declaration in front of me. 13:19:21
19 You want to put it in the Chat if you're 13:19:29
20 going to ask about that? 13:19:31
21 Q Yes. 13:19:36
22 A Can I get a copy here? 13:19:37

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1 MR. REEVES: Yeah, we have a paper copy of 13:19:40
2 this as well, without objection, Counsel. 13:19:42
3 MR. REYNOLDS: No objection. 13:19:45
4 MR. REEVES: And could I also note for the 13:19:50
5 record that both of these declarations are for the 13:19:51
6 IPR2025-00673. 13:19:55
7 BY MR. REYNOLDS: 13:20:02
8 Q Dr. Stern, can you confirm that the paper 13:20:02
9 you've just been given is -- bears the same exhibit 13:20:04
10 stamp as the one I put in the Chat, that is 13:20:08
11 Exhibit 1002? 13:20:12
12 A Yeah, I'm working on that. 13:20:17
13 Both of the -- both of the documents that 13:20:24
14 are in the Chat -- oh, this is 1002. 13:20:27
15 It's downloading right now. 13:20:41
16 Yes, it also has the -- yeah, Exhibit 13:20:45
17 No. 1002. 13:20:51
18 Q Okay. In Exhibit 1002, would you please go 13:20:54
19 to page 28 and look at paragraph 59? 13:21:11
20 A Yes. One second. I'm trying to -- I'm 13:21:15
21 trying to -- 13:21:26
22 THE COURT REPORTER: I can't hear you. 13:21:27

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1 THE WITNESS: Which paragraph? 13:21:29
2 BY MR. REYNOLDS: 13:21:29
3 Q 59 in Exhibit 1002. 13:21:31
4 A Okay. I'm there now. 13:21:41
5 Q And in -- in paragraph 59 of 1002, you cite 13:21:46
6 to two portions of the '675 patent. The first is 13:21:51
7 column 10, lines 32 to 38, and the second is column 13:21:56
8 10, lines 42 to 46, right? 13:22:00
9 A Yes. All I can say is that's what the text 13:22:03
10 says. Would you like me to look at the patent 13:22:08
11 itself? 13:22:10
12 Q No. I'm just confirming that the portions 13:22:11
13 of the '675 patent you cite in paragraph 59 of 13:22:13
14 Exhibit 1002 are the same portions you rely on in 13:22:18
15 paragraph 6 of your reply declaration, Exhibit 1202. 13:22:22
16 Can you tell me if that's the case? 13:22:30
17 A That is correct. 13:22:39
18 Q You said you don't have the -- the '675 13:22:49
19 patent in front of you; is that correct? 13:22:53
20 A It's here, but it hasn't been presented to 13:22:55
21 me. 13:22:58
22 Q I just put it in the Chat. 13:22:58

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1 When you're downloading it and taking a 13:23:19
2 look at it, could you please confirm that 13:23:21
3 Exhibit 1001 in the Chat is the same as Exhibit 1001 13:23:24
4 in front of you, based on the exhibit stamp on the 13:23:28
5 front page? 13:23:41
6 A Yes, it is the same. 13:23:41
7 Q Where in column 10 of the '675 patent does 13:23:48
8 it disclose an embodiment in which only distance is 13:23:57
9 used to classify voices? 13:24:00
10 MR. REEVES: Objection. Form. 13:24:07
11 THE WITNESS: Well, as I state in the 13:24:40
12 declaration -- in -- in the reply declaration, 13:24:42
13 the -- the claim language says classifying the voice 13:24:59
14 into either first voice or second voice based on the 13:25:02
15 calculated distance, and in column 10, I go on to 13:25:05
16 say: "The claims do not require the classification 13:25:11
17 to be based on anything other than distance. 13:25:13
18 Nothing in the claim precludes calculation [sic] 13:25:16
19 based on distance alone," and in the specification 13:25:20
20 in 32 to 38, column 10, also explicitly discloses 13:25:25
21 classifying based on distance alone. 13:25:30
22 BY MR. REYNOLDS: 13:25:35

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1 Q Where does it say that in column 10 of the 13:25:35
2 '675 patent? 13:25:37
3 MR. REEVES: Objection. Form. Asked and 13:25:41
4 answered. 13:25:59
5 THE WITNESS: The text in the specification 13:25:59
6 of this patent refers only to distance and nothing 13:26:00
7 else. 13:26:03
8 BY MR. REYNOLDS: 13:26:05
9 Q Which text are you referring to? 13:26:06
10 A I'm looking at the patent itself, column 13:26:09
11 10, 32 to 38, up to the end of the sentence there. 13:26:12
12 Q Can you read the portion you're relying on? 13:26:24
13 A Of course. 13:26:26
14 "Furthermore, a proximity sensor can be 13:26:28
15 provided in" -- actually, let me go back up to 32. 13:26:30
16 Yeah. 13:26:35
17 "Furthermore, a proximity sensor can be 13:26:35
18 provided in the output-content-control device 1, a 13:26:39
19 distance between the user H and the 13:26:44
20 output-content-control device 1 is calculated from a 13:26:46
21 detection result of the proximity sensor, and in 13:26:49
22 [sic] the distance can be used as a feature value to 13:26:54

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1 perform the classification to the first voice V1A 13:26:57
2 and the second voice V1B," or V-1-A and V-1-B. 13:27:02
3 "Moreover" -- that's it. 13:27:10
4 Q Okay. So the part you read says the 13:27:12
5 distance can be used as a feature value, right? 13:27:15
6 A Yes. 13:27:17
7 Q So what does the article -- does the 13:27:18
8 article "a" mean only -- the only feature value, or 13:27:20
9 does it mean one or more feature values? 13:27:26
10 A It means one -- 13:27:28
11 MR. REEVES: Objection. Form. 13:27:29
12 THE WITNESS: It means one or more, but the 13:27:31
13 specification discloses a method by which the 13:27:34
14 classification can be performed using distance 13:27:40
15 alone, and then it's what I declare in declaration. 13:27:46
16 BY MR. REYNOLDS: 13:27:54
17 Q Which portions -- which portions of this 13:27:54
18 column 10 state -- disclose an embodiment where only 13:27:56
19 distance is used? 13:28:03
20 MR. REEVES: Objection. Form. Asked and 13:28:05
21 answered. 13:28:09
22 THE WITNESS: It doesn't say only, but I 13:28:09

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1 don't claim that either. 13:28:12
2 The supposition on the table is that the 13:28:14
3 distance -- I'm sorry -- the classification can be 13:28:18
4 performed based only on distance. I do not assert 13:28:20
5 that that's the only way that the classification can 13:28:26
6 be performed. 13:28:30
7 BY MR. REYNOLDS: 13:28:49
8 Q Supposition aside, is there anywhere in the 13:28:50
9 patent where the patent expressly discloses a 13:28:52
10 bodiment [sic] that makes a classification of voices 13:28:55
11 using only distance? 13:28:59
12 MR. REEVES: Objection. Form. Asked and 13:29:02
13 answered. 13:29:04
14 THE WITNESS: I'm not sure. I don't 13:29:09
15 remember. 13:29:15
16 BY MR. REYNOLDS: 13:29:15
17 Q Would you look at paragraph 9? 13:29:20
18 A Yes. 13:29:22
19 Q Is there a distinction in your mind between 13:29:22
20 classifying inputs on one hand and adjusting outputs 13:29:28
21 on the other hand in output-content control devices? 13:29:33
22 MR. REEVES: Objection. Form. 13:29:42

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1 THE WITNESS: The '67 [sic] patent, as in 13:29:43
2 the case of the prior art references that we cite, 13:29:47
3 disclose adjusting output content based on the 13:29:51
4 classification decision of the distance measurement. 13:29:59
5 BY MR. REYNOLDS: 13:30:09
6 Q Those are two different processes, right? 13:30:09
7 MR. REEVES: Objection. Form. 13:30:13
8 THE WITNESS: No. It's a single process. 13:30:16
9 You measure the distance, and based on the results 13:30:19
10 of that calculation, you output one of two -- or 13:30:22
11 it's usually more than two -- forms of output. 13:30:33
12 BY MR. REYNOLDS: 13:30:40
13 Q So a POSITA in 2018 would have understood 13:30:41
14 that the process of classifying inputs in 13:30:44
15 output-content control devices is always a single 13:30:51
16 process with the process of adjusting outputs? 13:30:54
17 MR. REEVES: Objection. Misstates 13:30:59
18 testimony. Form. 13:31:01
19 THE WITNESS: That goes well beyond what I 13:31:06
20 said. 13:31:10
21 What I said was that the -- the '675 13:31:10
22 patent, as well as the relevant prior art, disclose 13:31:18

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1 modifying content in a device using speech based on 13:31:26
2 estimated distance. It certainly does not say that 13:31:33
3 that's the only way you can do all that. 13:31:37
4 BY MR. REYNOLDS: 13:31:45
5 Q Understood. And I'm not trying to twist 13:31:46
6 what you've said because my initial question was 13:31:48
7 outside the context of -- was not limited to just 13:31:51
8 the '675 patent or the prior art. 13:31:54
9 I asked, in general, in 2018, what -- is 13:31:57
10 there a distinction in your mind between the process 13:32:01
11 of classifying inputs and the process of adjusting 13:32:03
12 outputs in output-content control devices. 13:32:06
13 MR. REEVES: Objection. Form. Calls for 13:32:12
14 speculation. Outside the scope. 13:32:14
15 THE WITNESS: Okay. I'm sorry. I 13:32:15
16 appreciate the greater range of the question, but 13:32:17
17 what we're -- I think what your question is leading 13:32:27
18 to, and maybe I should ask you to repeat it -- 13:32:33
19 actually, please repeat the question. 13:32:36
20 BY MR. REYNOLDS: 13:32:42
21 Q Maybe I'll try it in a different way. 13:32:43
22 Would a POSITA have been able to determine 13:32:45

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1 how a device classifies inputs simply by looking at 13:32:48
2 how the device adjusts outputs? 13:32:53
3 MR. REEVES: Objection. Form. Incomplete 13:32:59
4 hypothetical. Outside the scope. 13:33:01
5 THE WITNESS: I think, in general, the 13:33:21
6 answer would be no. I don't believe that that's 13:33:22
7 relevant to the claims of the present patent or the 13:33:24
8 '337 patent. 13:33:31
9 BY MR. REYNOLDS: 13:33:32
10 Q And we are just talking in general. Why 13:33:32
11 would the answer be no? 13:33:34
12 MR. REEVES: Objection. Form. 13:33:40
13 THE WITNESS: Well, it's as we talked 13:33:51
14 before. 13:33:54
15 There are multiple ways of performing 13:33:55
16 classifications. There are different things that 13:33:57
17 can be measured, and what we're looking at is 13:33:59
18 content modification based on a classification 13:34:07
19 decision. The patents and prior arts' sources teach 13:34:11
20 the measurement of distance as one way or 13:34:17
21 accomplishing that, but it's not the only way. 13:34:20
22 And since the classification decisions 13:34:24

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1 are -- result in discrete outcomes, you don't know 13:34:27
2 what the mechanism was by which the class -- 13:34:37
3 classification decision was obtained. 13:34:40
4 BY MR. REYNOLDS: 13:35:06
5 Q I'd like to discuss a hypothetical 13:35:07
6 output-content control device that I came up with 13:35:15
7 this morning. 13:35:18
8 A We're always inventing. 13:35:19
9 Q I'm going to -- I'll call it a new 13:35:20
10 motivational output-content control device, and it's 13:35:23
11 pretty simple. When a user asks a question, it 13:35:26
12 measures the volume detected, and then it uses, you 13:35:30
13 know, a language model to develop an answer, and it 13:35:35
14 responds at twice the volume at which the user was 13:35:39
15 speaking. 13:35:43
16 So my logic would say output volume of the 13:35:46
17 device, call it OV, equals two times the input 13:35:49
18 volume of the device, IV. 13:35:54
19 In that hypothetical, is my device 13:36:00
20 classifying input voices? 13:36:05
21 MR. REEVES: Objection. Form. Calls for 13:36:11
22 speculation. Incomplete hypothetical. Outside the 13:36:12

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1 scope. 13:36:17
2 THE WITNESS: No. 13:36:17
3 BY MR. REYNOLDS: 13:36:24
4 Q Why not? 13:36:24
5 MR. REEVES: Same objections. 13:36:30
6 THE WITNESS: Classifying the device, as I 13:36:30
7 see it, or classifying anything as I see it, 13:36:34
8 describes taking an input measurement that, in 13:36:39
9 general, is continuous in nature and producing an 13:36:45
10 output that's one of a discrete number of categories 13:36:48
11 in the patents in question. Is the speaker closer 13:36:54
12 or is the speaker farther? 13:37:01
13 The system that you described really is -- 13:37:03
14 takes the input, measures the volume and outputs at 13:37:06
15 twice the volume, but there are no discrete 13:37:12
16 categories that are the results of the 13:37:15
17 classification decision. 13:37:17
18 BY MR. REYNOLDS: 13:37:23
19 Q What if I told you that my device processes 13:37:23
20 everything digitally? Would that change your 13:37:25
21 opinion? 13:37:28
22 A No. 13:37:29

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1 Q Because when you do digital signal 13:37:31
2 processing, everything has to be -- all variables, 13:37:35
3 inputs and outputs, have to be discrete, right? 13:37:41
4 MR. REEVES: Objection. Form. Calls for 13:37:48
5 speculation. Outside the scope. 13:37:51
6 THE WITNESS: Well, no. I teach the DSP 13:37:54
7 course at Carnegie Mellon, so this us my home turf. 13:37:59
8 But, no, we're still talking about 13:38:07
9 regardless of whether the process is continuous 13:38:10
10 using conventional components or digital or discrete 13:38:12
11 time using a computer, we're still talking about, 13:38:15
12 presumably, unlimited number of continuous or -- 13:38:19
13 discrete, but unlimited number of possible 13:38:24
14 outputs/outcomes. That's not classification. 13:38:28
15 BY MR. REYNOLDS: 13:38:34
16 Q You said they're all discrete, but there 13:38:35
17 are just an unlimited number of possibility -- 13:38:38
18 possible resolutions -- I don't know if that's the 13:38:43
19 right word or not. But at what point does it become 13:38:44
20 a classification? At what point do you have to 13:38:48
21 reduce the number of those discrete outputs to 13:38:51
22 render the classification having been made? 13:38:53

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1 MR. REEVES: Objection. Form. Incomplete 13:39:00
2 hypothetical. That outside the scope. 13:39:01
3 THE WITNESS: Classification happens when 13:39:05
4 you take a series of measurements, a measurement, 13:39:06
5 and analyze and make a decision about it. 13:39:12
6 And for classification, at least in the 13:39:16
7 context of the patents and the relative prior art, 13:39:20
8 the decision is in the form of a relatively small 13:39:29
9 number of alternatives, typically two or a small 13:39:31
10 number of additional alternatives, not a much larger 13:39:34
11 number of alternatives. 13:39:41
12 In this case, the patent discloses reducing 13:39:42
13 all of the possible things that are coming in into 13:39:49
14 two -- two groups, close to the device and far from 13:39:52
15 the device, and modifying the content based on that 13:39:56
16 classification. 13:40:01
17 BY MR. REYNOLDS: 13:40:10
18 Q You said the -- the decision is in the form 13:40:11
19 of a relatively small number of alternatives. So in 13:40:13
20 your opinion, the number of alternatives determines 13:40:18
21 whether a classification has been made or not? 13:40:20
22 MR. REEVES: Objection. Form. Outside the 13:40:23

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1 scope. 13:40:30
2 THE WITNESS: In principle, it's the number 13:40:30
3 of possible outcomes and also the extent to which 13:40:32
4 some analysis is performed on the input. 13:40:40
5 BY MR. REYNOLDS: 13:40:56
6 Q But in my hypothetical there was an 13:40:57
7 analysis on the input, right? We took input volume 13:40:59
8 and multiplied it by two. So would that be 13:41:02
9 sufficient analysis -- 13:41:05
10 MR. REEVES: Objection. 13:41:08
11 BY MR. REYNOLDS: 13:41:10
12 Q -- analysis -- 13:41:11
13 MR. REEVES: Sorry, Counsel. 13:41:12
14 BY MR. REYNOLDS: 13:41:13
15 Q -- to create a classification? 13:41:14
16 MR. REEVES: Objection. Form. Outside the 13:41:15
17 scope. Calls for speculation. Incomplete 13:41:16
18 hypothetical. 13:41:20
19 THE WITNESS: Certainly not in the way 13:41:20
20 classification is considered in the teachings of the 13:41:26
21 patents we're discussing today. They all specify 13:41:29
22 two or close to two outcomes, not a potentially 13:41:31

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1 infinite number of outcomes. 13:41:35
2 BY MR. REYNOLDS: 13:41:40
3 Q So what is the number at which -- of 13:41:40
4 outcomes at which we switch from a 13:41:43
5 non-classification to a classification having been 13:41:47
6 made? 13:41:49
7 MR. REEVES: Objection. Form. Outside the 13:41:51
8 scope. Calls for speculation. Incomplete 13:41:53
9 hypothetical. Asked and answered. 13:41:55
10 THE WITNESS: Depends on the context. 13:41:59
11 For speech recognition, for example, back 13:42:01
12 in the 1980s, being able to classify, say, a 13:42:04
13 thousand words was considered a big deal. Now we 13:42:12
14 routinely recognize and classify many more words in 13:42:17
15 a contemporary system. But in the context of 13:42:25
16 today's systems -- I'm sorry. 13:42:27
17 In the context of the discussions in the 13:42:30
18 disclosures of the two patents at issue here, there 13:42:37
19 are only two outcomes, and that's clearly different 13:42:40
20 from, you know, all the various amplitudes your 13:42:42
21 system could obtain. 13:42:47
22 BY MR. REYNOLDS: 13:42:52

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1 Q I wasn't asking about the prior art. I was 13:42:53
2 just asking: In general, what number serves as the 13:42:55
3 boundary line of outcomes between whether a 13:42:57
4 classification has been made and a classification 13:43:01
5 has not been made? 13:43:03
6 MR. REEVES: Same objections. 13:43:04
7 THE WITNESS: It's difficult to apply an 13:43:18
8 absolute number because, as technology advances, the 13:43:19
9 things that we can do in practice become 13:43:26
10 increasingly complex. The systems at issue here, 13:43:29
11 which, of course, were 2018 or so, all only have two 13:43:38
12 outcomes, and that's quite clear. 13:43:44
13 BY MR. REYNOLDS: 13:43:51
14 Q So how many outcomes would a POSITA have 13:43:51
15 had to add to the systems at issue here to make it 13:43:53
16 so that, in your opinion, no classification would 13:43:59
17 have been made? 13:44:02
18 MR. REEVES: Objection. Form. Calls for 13:44:03
19 speculation. Outside the scope. 13:44:07
20 THE WITNESS: I don't see how that's within 13:44:09
21 the scope of the claims of either patent. 13:44:11
22 BY MR. REYNOLDS: 13:44:21

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1 Q Well, I'm trying to figure out, you assert 13:44:21
2 that a classification has been made in part based on 13:44:23
3 the number of outcomes. 13:44:27
4 So if you were looking at the same art, how 13:44:28
5 many classifications would it have taken before your 13:44:32
6 opinion changed that there is -- sorry -- how many 13:44:34
7 outcomes would it have taken before, in your 13:44:38
8 opinion, the -- these systems, the prior art, no 13:44:41
9 longer rendered a classification of voices? 13:44:47
10 MR. REEVES: Objection. Form. Calls for 13:44:50
11 speculation. Incomplete hypothetical. Outside the 13:44:51
12 scope. 13:44:53
13 THE WITNESS: Yeah, I'm not going to 13:44:53
14 further speculate along those roads. I was asked to 13:44:56
15 opine about the disclosures of the two patents that 13:45:00
16 we're discussing today and the relevant prior art, 13:45:05
17 and in those cases, it's certainly only two outcomes 13:45:09
18 in the case of the patents, maybe slightly greater 13:45:15
19 number in some of the prior art. 13:45:19
20 BY MR. REYNOLDS: 13:45:25
21 Q But you don't have an opinion as to what 13:45:25
22 the upper bound would be of outputs that could 13:45:27

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1 remain a classification? 13:45:30
2 MR. REEVES: Same objections. 13:45:32
3 THE WITNESS: I might, but it's not 13:45:33
4 relevant to the patent. 13:45:34
5 BY MR. REYNOLDS: 13:45:35
6 Q Yeah. But I'm entitled to know if you have 13:45:35
7 it. Your lawyers will decide if it's relevant or 13:45:37
8 not when it comes to, you know, submitting it in 13:45:40
9 evidence. 13:45:44
10 So could you tell me what it is? 13:45:47
11 MR. REEVES: Same objections. 13:45:49
12 THE WITNESS: Do I have to come up with a 13:45:54
13 number? It's -- it's -- I -- I'm pushing back here 13:45:56
14 because it's really a moving target and very context 13:46:07
15 dependent. 13:46:11
16 As I indicated before, for example, in a 13:46:12
17 field that, you know, is close to my own experience, 13:46:20
18 the number of classifications that we could make in 13:46:22
19 speech recognition has really increased very 13:46:24
20 substantially, perhaps even exponentially over the 13:46:28
21 years with advances in the things that we can do. 13:46:32
22 So the best I can say is that there's no 13:46:37

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1 fixed number. It really depends on what you're 13:46:41
2 doing. But the key thing is whether you're binning 13:46:44
3 everything into a discrete number of decision 13:46:51
4 outcomes, and in this technology, you use those 13:46:55
5 decisions -- use those to do something substantially 13:47:03
6 different based on results of the classifications. 13:47:05
7 In the example that you cite, you're really 13:47:10
8 just outputting a signal, you know, taking something 13:47:15
9 coming in, analyzing it, and then displaying an 13:47:19
10 output without -- without anything bound that. 13:47:23
11 BY MR. REYNOLDS: 13:47:42
12 Q If you'd look at paragraph 10 of your reply 13:47:43
13 declaration, that's back on Exhibit 1202. 13:47:47
14 A Yes. 13:47:58
15 Q Is it your opinion that Shin, Shimomura, 13:47:58
16 and the '675 patent all disclose voice 13:48:02
17 output-content device -- devices that operate in the 13:48:05
18 same way? 13:48:08
19 MR. REEVES: Objection. Form. 13:48:10
20 THE WITNESS: Well, they don't do exactly 13:48:23
21 the same thing. They all modify their output based 13:48:25
22 on the estimated distance between the speaker and 13:48:28

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1 the device, and as I state in paragraph 10, the 13:48:31
2 references disclose classifying voice input by 13:48:40
3 distance in the same way as the '675 patent and, 13:48:43
4 therefore, in the same way as each other. 13:48:48
5 BY MR. REYNOLDS: 13:48:55
6 Q Is it your opinion that Shin, Shimomura, 13:48:55
7 and the '675 patent all classify voice input in the 13:48:59
8 same way? 13:49:03
9 MR. REEVES: Objection. Form. 13:49:03
10 THE WITNESS: That is what I state in 13:49:04
11 paragraph 10 of the reply declaration. 13:49:07
12 BY MR. REYNOLDS: 13:49:08
13 Q So there are no differences in the three of 13:49:09
14 those in how they classify voice input? 13:49:13
15 MR. REEVES: Objection. Form. Asked and 13:49:17
16 answered. 13:49:24
17 THE WITNESS: Only perhaps differences in 13:49:24
18 the low level implementation. 13:49:26
19 THE COURT REPORTER: I'm sorry. 13:49:28
20 "Differences in the"? I didn't hear you. 13:49:29
21 THE WITNESS: My apologies. The low level 13:49:33
22 implementation. 13:49:36

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1 BY MR. REYNOLDS: 13:49:37
2 Q What is low level implementation? 13:49:38
3 A How the algorithms are actually realized. 13:49:41
4 Q Can you explain a bit more what you mean by 13:49:51
5 "how the algorithms are realized"? 13:49:54
6 A Well, we disclose, in all cases, comparing 13:49:58
7 the estimated distance from the input to a 13:50:08
8 threshold, and how that's done may vary from system 13:50:19
9 to system. Would differ, for example, in the nature 13:50:22
10 of the sensors that are used and how they 13:50:34
11 communicate with the rest of the system. 13:50:36
12 MR. REEVES: Counsel, can we take a break? 13:50:54
13 MR. REYNOLDS: Yeah. I'd just like to 13:50:58
14 clarify, unless the witness would rather take a 13:51:00
15 break, but if I could just clarify his answer first, 13:51:02
16 that'd be my preference, but of course, I won't -- 13:51:05
17 THE WITNESS: No, go ahead and clarify. 13:51:09
18 Is that okay? 13:51:11
19 BY MR. REYNOLDS: 13:51:11
20 Q Yeah, I appreciate that. 13:51:13
21 So you said, "in the nature of the 13:51:14
22 sensors," but I'm not exactly sure how the nature of 13:51:17

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1 the sensors relates to how algorithms are realized. 13:51:22
2 Could you explain that a bit? 13:51:25
3 MR. REEVES: Objection. Form. 13:51:27
4 THE WITNESS: The original question was 13:51:29
5 what did I mean by low level details -- or low level 13:51:31
6 implementation, I think is what the original phrase 13:51:35
7 was. You have the transcript; I do not. 13:51:37
8 What I was thinking of was that the sensors 13:51:43
9 themselves would have different operating 13:51:45
10 principles, or at least could. The way in which the 13:51:52
11 information from the sensors interfaces with the 13:51:55
12 rest of the system could vary from sensor to sensor, 13:51:57
13 and, hence, the way that information is integrated, 13:52:01
14 the algorithms themselves, as we discussed 13:52:06
15 previously, are all quite simple. 13:52:08
16 BY MR. REYNOLDS: 13:52:32
17 Q So initially I asked about low level 13:52:32
18 implementation. I believe you gave me an answer 13:52:34
19 that asked how the algorithms are realized, and so 13:52:38
20 my attempt was to kind of focus on that language, 13:52:41
21 when you're talking about how algorithms are 13:52:45
22 realized, and I believe -- and I'm not trying to put 13:52:47

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1 words in your mouth. I believe you just said that 13:52:53
2 the algorithms are all simple between the prior art 13:52:56
3 and the '675 patent, but now I'm curious if you 13:53:00
4 could tell me what you meant by differences in how 13:53:03
5 the algorithms are realized. 13:53:05
6 MR. REEVES: Objection. Form, to the 13:53:07
7 extent it misstates testimony. 13:53:10
8 THE WITNESS: Yeah, I apologize. I think I 13:53:11
9 misunderstood the question. We'd already discussed 13:53:13
10 the fact that the algorithms all involve taking a 13:53:16
11 measurement of distance and comparing it to a 13:53:18
12 threshold. That would be the algorithm. 13:53:20
13 The question, as I heard it, focused on the 13:53:26
14 low level implementation details about how you build 13:53:29
15 a system around that, including the interaction of 13:53:33
16 the sensors and everything else -- everything else 13:53:37
17 that goes in -- in that system. 13:53:39
18 BY MR. REYNOLDS: 13:53:46
19 Q Okay. So is there a difference in how the 13:53:46
20 algorithms are realized in the '675 patent, Shin, 13:53:48
21 and Shimomura? 13:53:53
22 MR. REEVES: Objection. Form. 13:53:56

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1 THE WITNESS: I don't know. I'd have to 13:53:57
2 look at the code or the hardware of the device to be 13:54:02
3 able to answer that. 13:54:04
4 MR. REYNOLDS: Okay. We can take a break. 13:54:14
5 THE VIDEOGRAPHER: Okay. Stand by. 13:54:17
6 Going off the record. The time is 13:54. 13:54:18
7 (Recess.) 13:54:21
8 THE VIDEOGRAPHER: Back on the record. The 14:05:44
9 time is 14:05. 14:05:47
10 BY MR. REYNOLDS: 14:05:49
11 Q Dr. Stern, I'd like to talk a little bit 14:05:49
12 about Section 2(B) of your declaration, which begins 14:05:51
13 on page 16 in your reply declaration, to be clear. 14:05:54
14 A Which patent? 14:06:00
15 Q '675 patent. 14:06:01
16 A Page 16? 14:06:06
17 Q Yeah. So that'd be Exhibit 1202. 14:06:08
18 A Okay. 14:06:23
19 Q Here you offer your opinion that proposed 14:06:26
20 substitute claim 8 is indefinite, right? 14:06:28
21 A That's correct. 14:06:32
22 Q And the reason being is that the 14:06:33

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1 term "predetermined voice," in your opinion, is 14:06:36
2 indefinite? 14:06:41
3 A That's also correct. 14:06:42
4 Q Would you have the same opinion as to the 14:06:44
5 original claim, not claim 8, that use of the 14:06:48
6 term "predetermined voice" is indefinite? 14:06:53
7 MR. REEVES: Objection. Form. 14:06:56
8 Counsel, to clarify, you're asking about 14:07:12
9 claim 5, correct? 14:07:18
10 BY MR. REYNOLDS: 14:07:18
11 Q Well, let me start over and be a little 14:07:19
12 more clear. 14:07:21
13 Could you look at claim 1 of the '675 14:07:22
14 patent, please? 14:07:25
15 A Yes. 14:07:26
16 Q Is it your opinion that use of the 14:07:26
17 term "predetermined voice" also renders that claim 14:07:33
18 indefinite? 14:07:36
19 MR. REEVES: Objection. Form. Misstates 14:07:38
20 the exhibit. Outside the scope. 14:07:40
21 THE WITNESS: Yes. 14:07:44
22 BY MR. REYNOLDS: 14:07:45

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1 Q Oh, I'm sorry. I did mean claim 5. 14:07:46
2 Would you look at claim 5 and let me know 14:07:49
3 if the use of the term -- your counsel's right -- if 14:07:51
4 the use of the term "predetermined voice" in that 14:07:56
5 claim renders it indefinite? 14:08:00
6 MR. REEVES: Objection. Form. Outside the 14:08:03
7 scope. 14:08:44
8 THE WITNESS: There is a small difference 14:08:44
9 in that the original claim 5 referred to the 14:08:48
10 predetermined voice, and the proposed revised claim 14:08:52
11 8 refers to a predetermined voice. 14:09:00
12 BY MR. REYNOLDS: 14:09:04
13 Q Does that difference affect your opinion as 14:09:04
14 to whether use of the term "predetermined voice" in 14:09:07
15 either of those claims renders it indefinite? 14:09:10
16 MR. REEVES: Objection. Form. Outside the 14:09:14
17 scope. 14:09:18
18 THE WITNESS: Well, it could. As I say in 14:09:18
19 the declaration Section 1, I have multiple concerns 14:09:22
20 with the phrase "a predetermined voice." Basically, 14:09:29
21 in paragraph 43, I note that we don't really know 14:09:39
22 what that means. We don't know whether it's the 14:09:41

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1 first voice or the second voice or something else, 14:09:44
2 nor does it state how the voice is predetermined, 14:09:50
3 and as 44 states, the statement -- the specification 14:09:59
4 does not clarify that. 14:10:02
5 BY MR. REYNOLDS: 14:10:07
6 Q Is the confusion surrounding the 14:10:08
7 word "predetermined," the word "voice," or when 14:10:11
8 they're used together? 14:10:18
9 MR. REEVES: Objection. Form. 14:10:19
10 THE WITNESS: For me, the big problem is I 14:10:22
11 don't know what that points to. In other words, 14:10:25
12 what is meant by "a predetermined voice." 14:10:27
13 BY MR. REYNOLDS: 14:10:40
14 Q But it's clear what the term "voice" means 14:10:40
15 in the claims, right? 14:10:44
16 A Yes. 14:10:45
17 Q Okay. So it seems that the confusion 14:10:48
18 you're alluding to is really surrounding focused on 14:10:51
19 the term "predetermined." 14:10:55
20 MR. REEVES: Objection. Form. 14:10:57
21 THE WITNESS: But also the context. Again, 14:11:00
22 is it the first voice? the second voice? based on 14:11:05

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1 distance? Is it something else? 14:11:11
2 BY MR. REYNOLDS: 14:11:11
3 Q Well, you don't have a first voice or a 14:11:23
4 second voice until someone starts talking to the 14:11:25
5 device, right? 14:11:27
6 MR. REEVES: Objection. Form. 14:11:29
7 THE WITNESS: That's correct. 14:11:37
8 BY MR. REYNOLDS: 14:11:39
9 Q So a predetermined voice, wouldn't that 14:11:39
10 mean something that the device has predetermined, 14:11:42
11 that has built in before it begins operation? 14:11:48
12 MR. REEVES: Objection. Form. 14:11:54
13 THE WITNESS: In principle it could, but I 14:11:58
14 learned nothing from the specification. 14:12:00
15 BY MR. REYNOLDS: 14:12:28
16 Q Paragraph 44 of your reply, you say: "The 14:12:29
17 specification provides no clarification. It 14:12:33
18 discloses an embodiment in which '[t]he first voice 14:12:38
19 V1A corresponds to a predetermined voice'..." 14:12:45
20 Do you see that? 14:12:53
21 A I do. 14:12:53
22 Q So determining whether an incoming voice 14:13:01

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1 corresponds to a predetermined voice, that doesn't 14:13:04
2 give you an indication of what a predetermined voice 14:13:07
3 is? 14:13:11
4 MR. REEVES: Objection. Form. 14:13:12
5 THE WITNESS: Are you suggesting that the 14:13:18
6 patent teaches that the predetermined voice is 14:13:20
7 always V1A? 14:13:22
8 BY MR. REYNOLDS: 14:13:25
9 Q Well, it says it makes a determination as 14:13:26
10 to whether a voice corresponds to a predetermined 14:13:29
11 voice. Isn't that what it -- the quoted portion 14:13:32
12 says? 14:13:36
13 MR. REEVES: Objection, to the extent it 14:13:38
14 misstates the exhibit. Form. 14:13:39
15 THE WITNESS: Well, it looks like in the 14:14:21
16 system, as discussed in the original specification 14:14:26
17 in column 9, at the bottom of the column, it looks 14:14:29
18 like the predetermined voice is the first voice, but 14:14:36
19 in the context of whisper detection, which is what I 14:14:43
20 believe this part of proposed revised claim is all 14:14:47
21 about, we don't know whether -- we don't know 14:14:50
22 whether the predetermined voice or whether a 14:15:01

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1 predetermined voice is a voice with whisper or 14:15:03
2 without whisper. 14:15:08
3 So it's just not stated in -- in the 14:15:10
4 proposed claim or anywhere else. 14:15:16
5 BY MR. REYNOLDS: 14:15:23
6 Q Isn't that the point of the disclosed 14:15:23
7 embodiment, is to use a predetermined voice when 14:15:25
8 assessing whether an incoming voice is a whisper or 14:15:31
9 not? 14:15:36
10 MR. REEVES: Objection. Form. Calls for 14:15:40
11 speculation. 14:15:45
12 THE WITNESS: No. You can make an 14:15:45
13 assessment whether an incoming voice is whispered or 14:15:48
14 spoken naturally simply based on the analysis of the 14:15:52
15 input without anything to do with a predetermined 14:15:57
16 voice. 14:16:00
17 BY MR. REYNOLDS: 14:16:02
18 Q But could you also do that using a 14:16:02
19 predetermined voice? 14:16:04
20 MR. REEVES: Objection. Form. Calls for 14:16:07
21 speculation. Outside the scope. 14:16:10
22 THE WITNESS: In principle, yes, but the -- 14:16:13

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1 neither the claim nor the specification tells me 14:16:15
2 how. 14:16:18
3 BY MR. REYNOLDS: 14:16:39
4 Q So you said you can make an assessment 14:16:41
5 whether an incoming voice is whispered or spoken 14:16:44
6 naturally simply based on the analysis of the input 14:16:49
7 without anything to do with a predetermined voice, 14:16:51
8 right? 14:16:55
9 A That's correct. 14:16:56
10 Q How would you determine whether the system 14:17:00
11 is using a predetermined voice or not to make that 14:17:02
12 assessment? 14:17:07
13 MR. REEVES: Objection. Form. Calls for 14:17:08
14 speculation. Outside the scope. Incomplete 14:17:10
15 hypothetical. 14:17:22
16 THE WITNESS: Repeat the question again. 14:17:22
17 BY MR. REYNOLDS: 14:17:24
18 Q How would you determine whether a system 14:17:24
19 uses a predetermined voice or not when making that 14:17:27
20 assessment? 14:17:32
21 MR. REEVES: Same objections. 14:17:34
22 THE WITNESS: Well, I don't know and I 14:17:43

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1 don't need to, and the existence of a predetermined 14:17:45
2 voice does not help in any way in terms of the 14:17:49
3 detection of whisper. 14:17:51
4 BY MR. REYNOLDS: 14:17:55
5 Q Why not? 14:17:55
6 MR. REEVES: Same objections. 14:17:58
7 THE WITNESS: We talked about whisper 14:18:00
8 earlier today. Whisper detection would be 14:18:01
9 accomplished by -- yeah, at least I think we did. 14:18:06
10 A whisper detection would be accomplished 14:18:09
11 by looking for a peak in the autocorrelation 14:18:12
12 function, looking for a peak in -- or looking for a 14:18:15
13 peak above a threshold magnitude in the 14:18:20
14 autocorrelation function in the right place, looking 14:18:24
15 for a peak in the cepstral representation in the 14:18:26
16 right place of a certain magnitude. 14:18:30
17 None of that has anything to do with a 14:18:34
18 predetermined voice. 14:18:36
19 MR. REYNOLDS: For the court reporter, all 14:18:38
20 those "peaks" are P-E-A-K. 14:18:40
21 THE WITNESS: Thank you. 14:18:46
22 BY MR. REYNOLDS: 14:18:46

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1 Q Wouldn't it possible to store those 14:18:53
2 characteristics as representations of a 14:18:55
3 predetermined voice in a device? 14:18:57
4 MR. REEVES: Objection. Form. Calls for 14:18:58
5 speculation. Outside the scope. Lacks foundation. 14:18:59
6 THE WITNESS: Anything is possible, but it 14:19:04
7 would not be particularly helpful. 14:19:05
8 BY MR. REYNOLDS: 14:19:10
9 Q Why not? 14:19:10
10 MR. REEVES: Same objections. 14:19:13
11 THE WITNESS: As I stated a moment ago, 14:19:13
12 determination of whisper would be accomplished by 14:19:16
13 assessing the characteristics of the wave coming in 14:19:21
14 without resource to the predetermined voice. 14:19:25
15 BY MR. REYNOLDS: 14:19:33
16 Q So you said it wouldn't be helpful. Are 14:19:33
17 you aware of anyone else or any other system or 14:19:36
18 paper disclosure that -- well, let me start over. 14:19:39
19 Are you saying that there's no system or 14:19:42
20 other disclosures out there that would describe 14:19:45
21 using a predetermined voice to assess whether an 14:19:47
22 incoming voice is a whisper or not? 14:19:50

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1 MR. REEVES: Objection. Form, to the 14:19:53
2 extent it misstates testimony. Scope. 14:19:55
3 THE WITNESS: I am not aware of any such 14:19:57
4 system. 14:19:59
5 BY MR. REYNOLDS: 14:20:06
6 Q In your reply declaration, you make a 14:20:06
7 determination as to whether substitute claim 8 reads 14:20:08
8 on prior art, right? 14:20:12
9 A Where do I do that? 14:20:19
10 Q Well, I'll represent that in the kind of 14:20:23
11 patent law parlance, if you determine prior art 14:20:25
12 discloses -- let's say determine whether prior art 14:20:29
13 anticipates a claim or renders it obvious, the 14:20:33
14 process of doing that is determining whether the 14:20:35
15 claim reads on that prior art. So, I guess, maybe 14:20:38
16 I'll ask it a different way. 14:20:42
17 You rendered a determination as to whether 14:20:43
18 prior art renders obvious substitute claim 8, right? 14:20:46
19 A I do say that, and, yes, I believe that. 14:20:52
20 Q Okay. 14:20:57
21 A That's section beginning on paragraph 50. 14:20:58
22 Q And that process involves comparing 14:21:02

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1 substitute claim 8 to the prior art, right? 14:21:06
2 MR. REEVES: Objection. Form. 14:21:11
3 THE WITNESS: Yes. 14:21:15
4 BY MR. REYNOLDS: 14:21:16
5 Q That process involves looking at each of 14:21:16
6 the limitations of claim 8 and determining whether 14:21:18
7 that limitation is disclosed in the prior art, 14:21:22
8 right? 14:21:24
9 A That's correct. 14:21:27
10 MR. REEVES: Objection. Form. 14:21:28
11 BY MR. REYNOLDS: 14:21:31
12 Q If you don't understand or if you were 14:21:31
13 confused by what a predetermined voice is, how were 14:21:34
14 you able to determine that the prior art disclosed 14:21:39
15 it in the same context as claim 8? 14:21:40
16 MR. REEVES: Objection. Form. 14:21:44
17 THE WITNESS: There's no prior art that I'm 14:21:49
18 aware of concerning whisper detection that makes use 14:21:51
19 of a predetermined voice. 14:21:54
20 BY MR. REYNOLDS: 14:22:39
21 Q Could the voice disclosed in the '675 14:22:39
22 patent be classified based on a slope of the peak 14:22:44

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1 frequency of an incoming signal? 14:22:52
2 MR. REEVES: Objection. Form. Calls for 14:22:55
3 speculation and outside the scope. 14:22:57
4 THE WITNESS: One of the prior art 14:23:02
5 references suggests that. I believe it was Raitio. 14:23:06
6 Since we're looking at a series of peaks 14:23:24
7 over frequency and the slope of those points, and, 14:23:27
8 again, we're looking at the amplitude values of the 14:23:32
9 peaks of the spectrum over a series of frequencies 14:23:41
10 and looking at the slope of those points. 14:23:44
11 MR. REYNOLDS: For the court reporter's 14:23:59
12 benefit, I believe the pronunciation is Raitio, I 14:24:01
13 think. Either way it's pronounced -- or it's 14:24:05
14 spelled R-A-I-T-I-O. 14:24:08
15 THE WITNESS: Yes, thank you. 14:24:13
16 BY MR. REYNOLDS: 14:24:30
17 Q Could that determination be made by 14:24:30
18 comparing the slope to a threshold? 14:24:32
19 MR. REEVES: Objection. Form. 14:24:36
20 THE WITNESS: That's what the Raitio 14:24:55
21 reference suggests. 14:24:57
22 BY MR. REYNOLDS: 14:25:11

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1 Q What would the units of that threshold have 14:25:12
2 been? 14:25:16
3 MR. REEVES: Objection. Form. Outside the 14:25:16
4 scope. 14:25:19
5 THE WITNESS: Well, because the vertical 14:25:19
6 axis would be decibels and the horizontal axis would 14:25:26
7 be a measure of frequency such as hertz, it could be 14:25:32
8 something like decibels per kilohertz. 14:25:36
9 BY MR. REYNOLDS: 14:25:44
10 Q But you didn't mention that possibility in 14:25:44
11 paragraph 45 of your declaration, right? 14:25:45
12 A No. 14:26:03
13 Q Is it -- would it have been possible for a 14:27:14
14 POSITA to use a dimensionless threshold when 14:27:16
15 classifying voices? 14:27:20
16 MR. REEVES: Objection. Form. Outside the 14:27:23
17 scope. Calls for speculation. Incomplete 14:27:25
18 hypothetical. 14:27:44
19 THE WITNESS: Are you talking about 14:28:07
20 calculating a threshold or comparing thresholds? 14:28:08
21 BY MR. REYNOLDS: 14:28:08
22 Q I'm talking about making use of the 14:28:14

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1 threshold where the value of the threshold has no 14:28:18
2 units. 14:28:21
3 MR. REEVES: Same objections. 14:28:24
4 THE WITNESS: Well, I've previously stated 14:28:32
5 that in order for the threshold determination to be 14:28:36
6 meaningful, the units of the input must be the same 14:28:39
7 or perhaps similar to the units of the threshold. 14:28:48
8 Here we're talking about comparing different -- 14:28:54
9 different measurements, and the comparisons are 14:29:04
10 always, in the case of the -- the peaks of the -- 14:29:07
11 the peaks of the spectrum measurement, and I'm 14:29:20
12 looking at, for example, figure -- figure 8B and 8C 14:29:24
13 on page 22 of the declaration, which is from Raitio. 14:29:30
14 You asked me what the dimensions were. 14:29:36
15 Those were decibels per -- per hertz. Those you 14:29:39
16 could compare with each other. So there's no 14:29:45
17 inconsistency with what I said previously. 14:29:55
18 This question was about would you do the 14:29:58
19 comparison if the quantities were dimensionless, and 14:30:00
20 in principle, yes, although I'm struggling to think 14:30:06
21 of a relevant example. 14:30:09
22 BY MR. REYNOLDS: 14:30:23

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1 Q Well, outside the context of Raitio, could 14:30:23
2 a POSITA have used a threshold for the coefficients 14:30:28
3 associated with a signal after a Fourier transform 14:30:36
4 or cepstral analysis? 14:30:42
5 MR. REEVES: Objection. Form. Calls for 14:30:46
6 speculation. Incomplete hypothetical. Outside the 14:30:48
7 scope. Asked and answered. 14:30:50
8 THE WITNESS: Yes, I believe that one of 14:30:58
9 the prior art references -- I think it might have 14:31:00
10 been Chen -- talks about estimating the presence of 14:31:02
11 whisper but through spectral tilt, and they propose 14:31:10
12 using the ratio of the first cepstral coefficient 14:31:18
13 divided by the zero cepstral coefficient as an 14:31:24
14 estimate of spectral tilt and use that as a whisper. 14:31:30
15 So in principle, yes, those -- those would 14:31:40
16 be normalized -- those would be dimensionless, 14:31:42
17 rather. 14:31:49
18 BY MR. REYNOLDS: 14:31:49
19 Q You didn't mention that dimensionless 14:31:49
20 possibility in paragraph 45 of your reply 14:31:52
21 declaration, right? 14:31:55
22 A Paragraph 45 was talking about something 14:32:16

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1 different. Paragraph 45 was talking about how the 14:32:18
2 comparison to a threshold would be accomplished, and 14:32:27
3 what I was stating in that paragraph was that in 14:32:31
4 order to do that comparison, you have to have the 14:32:34
5 same units. 14:32:36
6 Here we're looking at two different -- two 14:32:44
7 different peaks that are already measured, rather 14:32:50
8 than comparing a single peak to a threshold. 14:32:56
9 Q I understand your explanation as to why, 14:33:04
10 but just for clarity, the dimensionless threshold 14:33:07
11 possibility is not mentioned in paragraph 45, right? 14:33:10
12 A That is correct, and in paragraph 45 I'm 14:33:20
13 saying that if there is dimension, it has to be the 14:33:24
14 same dimension. 14:33:29
15 Q I'd like to talk about Section 2(C) in your 14:33:53
16 declaration, beginning on paragraph -- page 19, 14:33:59
17 rather. 14:34:02
18 A Yes. 14:34:03
19 Q In this section you discuss written 14:34:08
20 description and enablement, right? 14:34:10
21 A That's correct. 14:34:12
22 Q What's your understanding of the difference 14:34:15

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1 between enablement and written description? 14:34:17
2 MR. REEVES: Objection. Form. Calls for a 14:34:21
3 legal conclusion. 14:34:27
4 THE WITNESS: Well, as we all know, I'm not 14:34:27
5 an attorney, so this will be fuzzy. 14:34:29
6 But as I state, my understanding is that 14:34:32
7 the written description has to be detailed enough so 14:34:41
8 that a person of ordinary skill in the art could 14:34:49
9 actually implement that. And, again, paragraph 47: 14:34:52
10 "...the [sic] claimed invention lacks adequate 14:35:00
11 written description if the patent's specification 14:35:02
12 does not convey with reasonable clarity to a person 14:35:04
13 of ordinary skill in the art that the inventor had 14:35:08
14 possession of the claimed invention at the time the 14:35:09
15 patent application was filed." 14:35:12
16 I go on to say that: "...a claim is 14:35:15
17 enabled only if a person of ordinary skill" -- as we 14:35:19
18 stated before -- "reading the specification, could 14:35:24
19 actually [sic] practice the claimed invention 14:35:27
20 without undue experimentation." 14:35:29
21 So the specification, and not the knowledge 14:35:32
22 of the person of ordinary skill, which we already 14:35:38

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1 assume, must supply novel aspects of the invention 14:35:40
2 to adequately enable it. 14:35:44
3 BY MR. REYNOLDS: 14:35:53
4 Q I've put in the Chat what's previously been 14:35:54
5 marked Exhibit 1016. Would you open that and let me 14:35:56
6 know when you have it up? 14:36:03
7 A So that's the Schuster reference, and the 14:36:35
8 exhibit that was passed through the Chat is the same 14:36:38
9 and labeled the same as my local copy of it. 14:36:41
10 Q Thank you. 14:36:57
11 Would you look at column 3, lines 1 to 11? 14:36:57
12 A Yeah, give me one second. I'm trying to 14:37:00
13 get the page off my screen. 14:37:03
14 Ah, finally. I'm sorry. It's my ineptness 14:37:45
15 with PCs. 14:37:56
16 Now I'm ready for the question. 14:37:59
17 Q Okay. Would you please read column 3, 14:38:06
18 lines 1 through 11 and let me know when you're done 14:38:08
19 reading it to yourself? 14:38:13
20 A Yes, I've done that. 14:38:48
21 Q Does that portion -- is that portion of 14:38:51
22 Schuster an enabling disclosure of a method for 14:38:55

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1 detecting whispered input? 14:39:01
2 MR. REEVES: Objection. Form. Calls for 14:39:05
3 speculation. Calls for a legal conclusion. Outside 14:39:06
4 the scope. 14:39:12
5 THE WITNESS: Well, as noted, I'm not an 14:39:12
6 attorney, and when I read that section of Schuster, 14:39:15
7 I was surprised and disappointed that it did not 14:39:25
8 have more explicit description disclosure. But I 14:39:30
9 think that's out of scope of what we're talking 14:39:40
10 about today. Schuster, you know, does disclose the 14:39:46
11 use of cepstral analysis. 14:39:52
12 BY MR. REYNOLDS: 14:39:58
13 Q Does the '675 patent also disclose use of 14:39:58
14 cepstral analysis? 14:40:01
15 MR. REEVES: Objection. Form. Calls for a 14:40:05
16 legal conclusion. 14:40:38
17 THE WITNESS: I'm looking for my -- I'm 14:40:38
18 first looking for a copy of the proposed -- here it 14:40:40
19 is. 14:40:46
20 So a cepstral analysis is not part of the 14:40:54
21 proposed claim language for the revised claim 8. 14:41:00
22 Cepstral analysis may be disclosed somewhere in the 14:41:12

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1 '675 patent, but I'd have to read through the patent 14:41:16
2 to -- to look for it. If you wanted to ask me a 14:41:20
3 question about that, you could point me to the place 14:41:23
4 in the -- in the spec. 14:41:26
5 BY MR. REYNOLDS: 14:41:35
6 Q Well, the -- you know, you assessed the 14:41:36
7 '675 patent to determine whether it contains an 14:41:38
8 enabling disclosure for claim 8, right? 14:41:42
9 A That's right. 14:41:50
10 Q That assessment focuses on the 14:41:50
11 specification, whether the specification enables the 14:41:53
12 claim, right? 14:41:55
13 A That's also correct. 14:41:57
14 Q So what I'm trying -- sorry. 14:42:00
15 A My assessment of the specification of the 14:42:02
16 '675 patent is that it does not -- when used in 14:42:06
17 conjunction with the revised proposed or the 14:42:14
18 proposed revised claim 8 does not enable the 14:42:20
19 detection of the whisper detection. 14:42:23
20 Q Okay. So I'm asking: Based on a similar 14:42:30
21 analysis, does column 3, one to 11 of Schuster 14:42:32
22 provide an enabling disclosure of detecting 14:42:39

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1 whispers? 14:42:43
2 MR. REEVES: Objection. Form. Outside the 14:42:44
3 scope. Calls for a legal conclusion. 14:42:45
4 THE WITNESS: I was not asked to opine 14:43:00
5 about whether the Schuster reference is valid or 14:43:02
6 not. We just cite it. 14:43:07
7 BY MR. REYNOLDS: 14:43:07
8 Q Okay. But looking at column 3, lines 1 to 14:43:20
9 11, can you envision how that could constitute an 14:43:24
10 enabling disclosure based on the level of 14:43:30
11 specificity and detail in it, but the specification 14:43:33
12 of the '675 patent could not constitute enabling 14:43:35
13 disclosure -- disclosure? 14:43:40
14 MR. REEVES: Objection. Form. Outside the 14:43:41
15 scope. Calls for a legal conclusion. Asked and 14:43:43
16 answered. 14:43:49
17 THE WITNESS: The only thing that I can say 14:43:49
18 here is that I've only been asked to opine about the 14:43:51
19 proposed claim language and lack of description in 14:43:54
20 the specification for the proposed revised claim 8, 14:44:03
21 and in my opinion, there's not enough adequate 14:44:13
22 specification. I wasn't asked to opine about 14:44:18

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1 Schuster, so I won't. 14:44:24
2 BY MR. REYNOLDS: 14:44:26
3 Q Can you identify anything in these 11 lines 14:44:26
4 of Schuster that would have provided adequate 14:44:29
5 description or enabling disclosure if it had been 14:44:36
6 included in the '675 patent? 14:44:40
7 MR. REEVES: Objection. Form. Outside the 14:44:42
8 scope. Calls for a legal conclusion. Calls for 14:44:43
9 speculation. 14:44:48
10 THE WITNESS: No. 14:44:48
11 BY MR. REYNOLDS: 14:45:08
12 Q Is it true that in 2018 only two options 14:45:08
13 existed for determine -- to determining whether a 14:45:12
14 received voice was a whisper based on a threshold? 14:45:16
15 MR. REEVES: Objection. Form. Outside the 14:45:21
16 scope. 14:45:34
17 THE WITNESS: There were more. The two 14:45:34
18 that I described -- and, in fact, Raitio and Chen 14:45:35
19 disclose several others, but the two that I 14:45:43
20 described were the best ways of performing that 14:45:46
21 detection. 14:45:51
22 BY MR. REYNOLDS: 14:46:32

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1 Q So you talk about the two that you describe 14:46:32
2 were the best ways. How many other ways were there? 14:46:34
3 How many other options? 14:46:36
4 MR. REEVES: Objection. Form. Outside the 14:46:42
5 scope. 14:46:46
6 THE WITNESS: Well, there are many. It 14:46:46
7 depends on what you'd call a different option. 14:46:51
8 As I mentioned, Raitio and Chen list a few 14:47:01
9 addition -- additional ones. I think the -- that 14:47:04
10 some of those are not nearly as effective as the two 14:47:09
11 that I've mentioned, but if you wish, I can count 14:47:15
12 the number of options listed in Raitio and Chen. 14:47:18
13 There was a lot of them. 14:47:30
14 BY MR. REYNOLDS: 14:47:32
15 Q That's okay. We can put that aside for 14:47:32
16 now. 14:47:35
17 In Section 2(D) of your declaration, you 14:47:37
18 discuss additional prior art that is raised for 14:47:46
19 the -- for the first time in your reply declaration 14:47:56
20 that was not raised in your original declaration, 14:47:58
21 right? 14:48:00
22 A That's correct. This is prior art that's 14:48:01

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1 relative to the proposed revised claim. 14:48:04
2 Q Who located that additional prior art? 14:48:09
3 MR. REEVES: Objection. Outside the scope. 14:48:16
4 Form. 14:48:18
5 THE WITNESS: Well, I looked for some 14:48:22
6 additional sources. The attorneys representing 14:48:30
7 myself and Amazon looked for some others. These 14:48:36
8 prior art sources were identified by somebody at 14:48:43
9 Morgan, Lewis. It could have been a paralegal, a 14:48:52
10 researcher. I just don't know. 14:48:55
11 BY MR. REYNOLDS: 14:48:59
12 Q Does your declaration -- does your reply 14:48:59
13 declaration address any prior art that you found? 14:49:03
14 MR. REEVES: Objection to form. 14:49:06
15 THE WITNESS: Well, I spent a lot of time 14:49:08
16 talking about the two methods that I believe are the 14:49:15
17 most useful and effective for performing whisper 14:49:19
18 declaration -- I'm sorry -- for performing whisper 14:49:25
19 detection. These are all methods that I've known 14:49:28
20 about for years. I can't recall when I originally 14:49:32
21 found those methods, but they're in the literature 14:49:36
22 and widely disseminated. 14:49:40

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1 BY MR. REYNOLDS: 14:49:46
2 Q Does your reply declaration address any 14:49:46
3 prior art document that you were able to find? 14:49:50
4 MR. REEVES: Objection. Form. Outside the 14:49:54
5 scope. 14:50:03
6 THE WITNESS: No. I did not consider that 14:50:03
7 to be necessary. When I talked about my concerns 14:50:05
8 about the description of whisper detection, that was 14:50:13
9 based on my own background and expertise. 14:50:18
10 BY MR. REYNOLDS: 14:50:27
11 Q Does any of the prior art addressed in your 14:50:28
12 reply declaration include the words "peak 14:50:31
13 frequency"? 14:50:36
14 MR. REEVES: Objection. Form. 14:50:39
15 THE WITNESS: I would have to look. 14:50:41
16 The Raitio reference, although it does 14:50:44
17 not -- it may or may not use the term "peak 14:50:56
18 frequency," refers to something that basically is 14:50:59
19 peak -- peak frequency. 14:51:04
20 And, again, as I argue in the declaration, 14:51:06
21 the phrase "peak frequency" is a misnomer. I state 14:51:09
22 that by that, a POSITA would understand the 14:51:14

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1 amplitude at a frequency for which the -- for which 14:51:19
2 the magnitude or intensity, whatever, is maximum. 14:51:24
3 We would understand that to be the peak frequency, 14:51:29
4 but it really is not -- it's not -- when we talk 14:51:32
5 about the -- the amplitude there, even though the 14:51:36
6 frequency is the frequency. 14:51:39
7 BY MR. REYNOLDS: 14:51:43
8 Q We lawyers can sometimes be semantic, and 14:51:44
9 so I understand your opinion on that front. But 14:51:46
10 what I want to know is whether you identified the 14:51:49
11 phrase "peak frequency," that exact phrase, in any 14:51:52
12 of the prior art you address in your reply 14:51:59
13 declaration. 14:52:02
14 MR. REEVES: Objection. Form. Scope. 14:52:04
15 Asked and answered. 14:52:05
16 THE WITNESS: I don't remember. I can 14:52:05
17 look, but -- but I don't remember. 14:52:08
18 BY MR. REYNOLDS: 14:52:13
19 Q In fact, none of them even include the 14:52:14
20 word "peak"; isn't that right? 14:52:16
21 MR. REEVES: Same objections. 14:52:21
22 THE WITNESS: They might not, but if you -- 14:52:21

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1 if we turn our attention to the figures on page 22, 14:52:26
2 Raitio does disclose that the difference between the 14:52:35
3 spectrum that's observed for speech that's not 14:52:40
4 whispered, which is on the left, and the whispered 14:52:43
5 speech, which is on the right, is characterized by, 14:52:46
6 shall we say, those cyclic variations in what's 14:52:51
7 labeled as amplitude on -- on the chart, and those 14:52:53
8 cyclic variations actually are a reflection of the 14:53:02
9 periodicity in the voicing. 14:53:08
10 And what he's calling attention to is the 14:53:10
11 fact that the first peak that you observe is not at 14:53:13
12 zero -- is not at zero on the frequency axis, but is 14:53:18
13 somewhere else. 14:53:25
14 Now, he doesn't use the word "peak," but 14:53:25
15 that's what Raitio -- and I don't know if it's a he 14:53:29
16 or a she, but that's what Raitio is talking about -- 14:53:34
17 or even a they. 14:53:38
18 MR. REEVES: Counsel, would now be a good 14:54:01
19 time for a break, or are you wrapping up? 14:54:03
20 MR. REYNOLDS: We can take a break. 14:54:06
21 THE VIDEOGRAPHER: Okay. Stand by. 14:54:11
22 We are going off the record. The time is 14:54:12

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1 14:54. 14:54:13
2 (Whereupon, at 2:54 p.m., the 14:54:20
3 proceedings in the above-entitled matter were 14:54:20
4 recessed, to reconvene at 3:29 p.m., this same day.) 14:54:20
5 AFTERNOON SESSION 14:54:20
6 (3:29 p.m.) 15:28:59
7 THE VIDEOGRAPHER: Back on the record. The 15:29:05
8 time is 15:29. 15:29:06
9 CONTINUED EXAMINATION BY COUNSEL FOR THE 15:29:06
10 PATENT OWNER 15:29:10
11 BY MR. REYNOLDS: 15:29:12
12 Q Dr. Stern, I'd like to talk about the '675 15:29:13
13 patent. 15:29:17
14 A Okay. 15:29:17
15 Q What is the '675 patent directed to, 15:29:18
16 generally speaking? 15:29:22
17 MR. REEVES: Objection. Form. 15:29:24
18 THE WITNESS: Understand that it is voice 15:30:56
19 input-output devices modified by distance 15:30:59
20 calculations. 15:31:05
21 BY MR. REYNOLDS: 15:31:11
22 Q Does the specification in the '675 patent 15:31:12

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1 describe any problems that the inventor sought to 15:31:13
2 solve? 15:31:17
3 MR. REEVES: Objection. Form. 15:31:22
4 THE WITNESS: Well, stated in paragraph 44 15:32:02
5 of the original declaration: "The '675 patent 15:32:04
6 describes an 'output content control device' that 15:32:07
7 analyzes a user's voice and generates a response." 15:32:13
8 BY MR. REYNOLDS: 15:32:22
9 Q Does the patent describe -- I'm sorry. 15:32:22
10 A Go ahead. No, I didn't say anything. 15:32:25
11 Q Does the patent describe any particular 15:32:27
12 problem -- problem that it attempted to improve upon 15:32:30
13 in connection with those devices? 15:32:32
14 MR. REEVES: Objection. Form. 15:32:36
15 THE WITNESS: I'm sorry. I was reading the 15:34:08
16 wrong reference. 15:34:09
17 In the background section of the '675 15:34:52
18 patent -- this would be column 1, lines 28 to 37 or 15:34:54
19 so -- the inventor describes a desire to create a 15:35:02
20 system with outputs that aren't known to people 15:35:15
21 other than the users. In other words, modifying the 15:35:21
22 output so as to make the output difficult to be 15:35:28

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1 understood by people other than the user content of 15:35:35
2 the content of notification of is output. 15:35:43
3 BY MR. REYNOLDS: 15:35:51
4 Q Do the claims of the '675 patent cover that 15:35:51
5 system? 15:35:53
6 MR. REEVES: Objection. Calls for a legal 15:36:00
7 conclusion. Form. 15:36:01
8 THE WITNESS: Yes. 15:37:03
9 BY MR. REYNOLDS: 15:37:03
10 Q Do the claims extend beyond output-content 15:37:13
11 control devices? 15:37:18
12 MR. REEVES: Objection. Form. Calls for a 15:37:22
13 legal conclusion. 15:37:45
14 THE WITNESS: Claims 1 through 5 explicitly 15:37:45
15 begin with a description of output-content control 15:37:47
16 devices, claim 6 refers to an output-content control 15:37:53
17 method, and claim 7 refers to a storage medium that 15:37:58
18 stores an output-content control program. 15:38:06
19 BY MR. REYNOLDS: 15:38:26
20 Q Are the inventions described in the '675 15:38:27
21 patent used to improve devices or systems other than 15:38:30
22 output-control devices or systems containing 15:38:37

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1 output-control devices? 15:38:40
2 MR. REEVES: Objection. Form. 15:38:42
3 THE WITNESS: I believe that the patent 15:38:50
4 discloses various different forms or embodiments of 15:38:53
5 output-content control devices. 15:38:59
6 BY MR. REYNOLDS: 15:39:37
7 Q But could the inventions that the inventor 15:39:37
8 recited in the claims -- could that technology be 15:39:40
9 used to improve devices other than output-content 15:39:44
10 control devices? 15:39:50
11 MR. REEVES: Objection. Form. 15:39:50
12 BY MR. REYNOLDS: 15:39:51
13 Q Does it apply to any other type of devices? 15:39:51
14 A Well, I don't know. That's outside the 15:39:55
15 scope of the patent. 15:40:00
16 Q Can you, as you sit here today, think of 15:40:00
17 any other device that can be improved using the 15:40:04
18 claimed inventions, other than an output-content 15:40:07
19 control device? 15:40:11
20 MR. REEVES: Objection. Form. Outside the 15:40:13
21 scope. 15:40:17
22 THE WITNESS: Excuse me. 15:40:17

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1 I imagine I could, but I haven't been asked 15:40:21
2 to opine on that topic, so I respectively decline -- 15:40:24
3 respectfully decline. 15:40:30
4 BY MR. REYNOLDS: 15:40:32
5 Q Understood. 15:40:33
6 But how do you know you could then? If 15:40:34
7 you're declining to do it, how do you imagine that 15:40:37
8 you could? What would be the basis for saying that? 15:40:42
9 MR. REEVES: Objection. Form. 15:40:45
10 THE WITNESS: Don't know really. 15:41:03
11 BY MR. REYNOLDS: 15:41:17
12 Q If you'd go to Section 2(A) of your 15:41:17
13 declaration, please. 15:41:20
14 A This is the original declaration for the 15:41:22
15 '675 patent? 15:41:24
16 Q I'm sorry. No. I'm sorry. 15:41:24
17 Reply declaration, Exhibit 1202. 15:41:25
18 A Okay. What section again? 15:41:28
19 Q 2(A) beginning at paragraph 25. 15:41:41
20 A Okay. 15:41:59
21 Q Did you provide the opinions in Section 15:41:59
22 2(A) at the request of Amazon's counsel? 15:42:04

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1 A Yes. 15:42:07
2 Q What were you asked to do in connection 15:42:08
3 with that section -- or I'm sorry. 15:42:12
4 What were you asked to do that led to the 15:42:16
5 opinions that you put in that section? 15:42:18
6 A I was asked -- 15:42:21
7 MR. REEVES: Objection. Form. 15:42:23
8 THE WITNESS: Sorry. 15:42:25
9 I was asked to opine on the -- the extent 15:42:25
10 to which or the way in which the claim recited 15:42:33
11 merely collecting information and analyzing 15:42:37
12 information and presenting results. 15:42:47
13 BY MR. REYNOLDS: 15:42:54
14 Q And how did you go about making that 15:42:54
15 assessment? 15:42:56
16 A Well, the request is pretty 15:42:57
17 straightforward. I asked, "does the system collect 15:43:07
18 information?" It does. "Does the system analyze 15:43:13
19 information?" It does. And, "Does the system 15:43:20
20 present results?" It does that as well. 15:43:24
21 And I noted, as described in paragraph 27 15:43:45
22 of the reply declaration, that the patent did not 15:43:48

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1 identify the proximity sensor as the focus of the 15:44:01
2 claimed advance. They -- in classifying the voice, 15:44:04
3 the specification described only way -- one way of 15:44:15
4 doing it, by comparing the calculated distance to a 15:44:18
5 threshold value, classifying accordingly, which was 15:44:23
6 analyzing information, and that the voice 15:44:31
7 classifying compared -- disclosed comparing the 15:44:38
8 incoming data to a threshold, which was analysis of 15:44:43
9 information without providing any detail how the 15:44:46
10 analysis occurred. 15:44:53
11 The last part of the assertion concerned 15:45:13
12 generating output information, and of course, as I 15:45:15
13 state in paragraph 32 of the declaration -- the 15:45:32
14 reply declaration, the claim requires something that 15:45:34
15 generates output information, which is presenting 15:45:40
16 results. 15:45:42
17 Q Did you apply any legal standards when 15:45:58
18 rendering the opinions in Section 2(A)? 15:46:01
19 A Not beyond those sections that were 15:46:05
20 disclosed in the -- in the title, collecting 15:46:12
21 information, analyzing information, preparing 15:46:22
22 results -- presenting results. As -- as I've noted, 15:46:25

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1 by -- by not being an attorney, I don't consider 15:46:30
2 myself qualified to do that. 15:46:32
3 Q You understand why you were asked to 15:46:40
4 determine whether the claims recite collecting 15:46:43
5 information, analyzing information, and presenting 15:46:48
6 results? 15:46:51
7 MR. REEVES: Objection to the extent it 15:46:52
8 calls for privileged information. 15:46:54
9 Dr. Stern, you can answer yes or no. 15:46:55
10 THE WITNESS: I believe the question was 15:47:00
11 did you understand why? 15:47:02
12 BY MR. REYNOLDS: 15:47:02
13 Q Yes. 15:47:04
14 A And, no. 15:47:05
15 Q So I -- it sounds like, in connection with 15:47:13
16 your task, the term "collecting" -- the term, in 15:47:16
17 paragraph 25, whether the claim reflects nothing 15:47:21
18 more than collecting information, analyzing 15:47:26
19 information, presenting results was provided to you, 15:47:28
20 right? 15:47:32
21 A That phrase was, yes. I've stated that. 15:47:32
22 Q Okay. 15:47:34

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1 Are you aware of any prior art or related 15:47:47
2 user content devices that do not collect 15:47:52
3 information, analyze information, and present 15:47:55
4 results? 15:47:57
5 MR. REEVES: Objection. Form. Outside the 15:47:58
6 scope. 15:48:03
7 THE WITNESS: I think the question -- I 15:48:03
8 think what I was supposed to opine on was the 15:48:08
9 question of whether the system does anything beyond 15:48:10
10 that, is their original analysis that a very generic 15:48:13
11 system wouldn't have been able to do that was 15:48:20
12 interesting in and of itself. 15:48:23
13 BY MR. REYNOLDS: 15:48:37
14 Q So a voice content-control device, in your 15:48:37
15 opinion, does nothing more than collect information, 15:48:43
16 analyze information, and present results when it 15:48:45
17 takes a user's speech, processes it, and then 15:48:48
18 outputs an audio signal? Is that your opinion? 15:48:53
19 A Well -- 15:48:57
20 MR. REEVES: Objection. Form. Outside the 15:48:58
21 scope. Incomplete hypothetical. 15:49:03
22 THE WITNESS: I'll only say that my opinion 15:49:06

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1 was limited to the proposed revision -- the proposed 15:49:07
2 additional claim 8. 15:49:11
3 BY MR. REYNOLDS: 15:49:23
4 Q Okay. Well, I'm not asking about claim 8. 15:49:23
5 I'm just asking about a voice content-control device 15:49:25
6 that receives a user's speech, processes it, and 15:49:28
7 then outputs an audio signal. Would you say that 15:49:33
8 such a device does nothing more than collect 15:49:36
9 information, analyze information, and present 15:49:38
10 results? 15:49:40
11 MR. REEVES: Objection. Form. Incomplete 15:49:42
12 hypothetical. Outside the scope. 15:49:44
13 THE WITNESS: I don't know. I haven't 15:49:48
14 thought about it and wasn't asked to do so. 15:49:49
15 BY MR. REYNOLDS: 15:49:56
16 Q Could you answer now? 15:49:56
17 MR. REEVES: Same objections. 15:50:00
18 THE WITNESS: Well, I'd have to spend some 15:50:01
19 time studying the field, the available technology. 15:50:03
20 BY MR. REYNOLDS: 15:50:11
21 Q Well, it seems to me -- I'm sorry. 15:50:11
22 A I prefer not to -- and just would prefer 15:50:13

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1 not to speculate. 15:50:15
2 Q Okay. Well, it seems to me that looking at 15:50:18
3 the device -- there's an Alexa down there or 15:50:22
4 something -- 15:50:27
5 A Mm-hmm. 15:50:27
6 Q -- that listens to me talk, processes 15:50:29
7 something, determines an output, and presents an 15:50:32
8 audio signal back to me. It seems to me to be a 15:50:34
9 little reductionist to say that device merely -- 15:50:39
10 merely collects information, analyzes information, 15:50:42
11 and presents results. It seems like a pretty 15:50:43
12 reductionist way to describe that. 15:50:46
13 Would you agree with that statement or 15:50:48
14 would you disagree with that statement? 15:50:51
15 MR. REEVES: Objection. Form. Incomplete 15:50:53
16 hypothetical. Outside the scope. 15:50:54
17 THE WITNESS: There's a lot of -- I don't 15:51:11
18 want to say too much because anything I say is 15:51:18
19 really speculation without real analysis. 15:51:22
20 But I will say that when the first Echo 15:51:25
21 appeared, the first demo that we had was very 15:51:32
22 impressive to all of us speech researchers in my 15:51:38

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1 research group, and what was most impressive was 15:51:41
2 that the speech recognition technology at a distance 15:51:45
3 was effective. 15:51:51
4 And there was something in there that 15:51:53
5 wasn't in the prior art, and -- which I assume -- I 15:51:57
6 don't know, but I assume has been disclosed by other 15:52:05
7 Amazon patents. And that to me is what makes the 15:52:07
8 system behind you interesting and patentable in a 15:52:12
9 way in which the proposed system disclosed here is 15:52:20
10 not. 15:52:26
11 BY MR. REYNOLDS: 15:52:40
12 Q You described something that makes a system 15:52:40
13 patentable. Are you aware that Amazon routinely 15:52:42
14 argues that any discussion of whether something is 15:52:45
15 novel or patentable has nothing to do with whether 15:52:47
16 it merely collects information, analyzes 15:52:50
17 information, and presents results? 15:52:52
18 MR. REEVES: Objection. Form. Outside the 15:52:54
19 scope. 15:53:02
20 THE WITNESS: I was not aware and don't 15:53:02
21 consider it relevant to this discussion, which 15:53:04
22 concerns my comments on the '675 and '337 patents. 15:53:06

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1 BY MR. REYNOLDS: 15:53:27
2 Q Are you aware that Amazon filed briefs in a 15:53:28
3 District Court action that addressed some of the 15:53:31
4 similar copies to which you raise in Section 2(A)? 15:53:34
5 A yes or no is fine. 15:53:38
6 A No. No, I was not aware. No is the 15:53:40
7 answer. 15:53:44
8 Q Is it your opinion that a POSITA would not 15:54:22
9 have known how to use a threshold in connection with 15:54:24
10 making a whisper/non-whisper determination without 15:54:27
11 more information? 15:54:31
12 MR. REEVES: Objection. Form. Incomplete 15:54:34
13 hypothetical. 15:54:54
14 THE WITNESS: My opinions were merely that 15:54:54
15 there was not enough specificity in the claim 15:54:58
16 language and enough support in the specification in 15:55:01
17 the patent to enable a POSITA to realize the 15:55:09
18 invention unambiguously. 15:55:12
19 BY MR. REYNOLDS: 15:55:17
20 Q I'm not asking if a POSITA would realize 15:55:18
21 the invention unambiguously. I'm just asking if in 15:55:21
22 your opinion -- in your opinion, whether a POSITA 15:55:25

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1 would not have known how to use a threshold in 15:55:28
2 connection with making a whisper/non-whisper 15:55:31
3 determination without more information. 15:55:36
4 MR. REEVES: Objection. Form. Incomplete 15:55:38
5 hypothetical. 15:55:55
6 THE WITNESS: Well, I believe we've already 15:55:55
7 discussed this, especially in the beginning of the 15:55:57
8 day. We talked about a couple of methods that -- 15:55:58
9 for whisper detection that both involved comparing 15:56:04
10 something to a threshold. My concern about the 15:56:08
11 proposed claim language was that -- I don't want to 15:56:15
12 use -- define the phrase "non-obvious" since it's a 15:56:21
13 term of art here. 15:56:27
14 My concern with the proposed language was 15:56:29
15 that I didn't know exactly what I was to measure or 15:56:31
16 how I would take the measurement, again, from the 15:56:34
17 claim language and the support from the spec in 15:56:37
18 order to do that measurement. 15:56:41
19 BY MR. REYNOLDS: 15:56:49
20 Q So if I asked a POSITA to create a device 15:56:50
21 that determines whether input speech is a whisper or 15:56:56
22 non-whisper and to do it using a threshold, could a 15:57:00

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1 POSITA -- could a POSITA have figured that out 15:57:05
2 without a lot of experimentation, or would a POSITA 15:57:07
3 have not known how to do that? 15:57:11
4 MR. REEVES: Objection. Form. Incomplete 15:57:14
5 hypothetical. 15:57:35
6 THE WITNESS: A POSITA could have read the 15:57:35
7 references that described the methods that I talked 15:57:37
8 about, and as I talk about in the declaration, the 15:57:43
9 claim language is very specific. 15:58:12
10 A POSITA would not know what predetermined 15:58:17
11 voice meant, whether the voice is classified as a 15:58:20
12 first voice or second voice based on distance. The 15:58:24
13 spec doesn't clarify the POSITA would not know, as I 15:58:27
14 state in paragraph 45, the boundaries of the claim 15:58:34
15 limitation. Relevant limitation only being the text 15:58:39
16 that's reprinted on the top of page 18. And a 15:58:46
17 POSITA would have the difficulties that I list of 15:59:02
18 implementing the disclosures of the proposed revised 15:59:08
19 claim 8. 15:59:14
20 So I would say, no, the -- the proposed 15:59:17
21 amended claim wouldn't lead the POSITA to that -- to 15:59:37
22 that -- to that invention. 15:59:41

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1 BY MR. REYNOLDS: 15:59:52
2 Q Can you look at paragraph 36 of your reply 15:59:53
3 declaration? 16:00:01
4 A Yes, one page away. 16:00:02
5 Q I'm sorry? 16:00:06
6 A Yes. 16:00:07
7 Q Okay. When you've had a chance to look at 16:00:07
8 that, can you explain to me generally what you're 16:00:11
9 stating in that paragraph? 16:00:15
10 MR. REEVES: Objection. Form. 16:00:19
11 THE WITNESS: What I'm stating is that what 16:00:32
12 the proposed invention does is a process that you 16:00:40
13 and I routinely do when we're -- when we're talking 16:00:47
14 to somebody else. 16:00:54
15 Sometimes the things that we're discussing, 16:01:00
16 like the weather or state of traffic downtown or 16:01:03
17 non-controversial other things, for example, health 16:01:09
18 or money, are sensitive in one fashion or another. 16:01:14
19 And in talking about sensitive topics, if you're 16:01:22
20 close to the other person that you're talking to, 16:01:33
21 you would -- you know, you might speak normally 16:01:36
22 assuming that you would not be overheard; whereas, 16:01:39

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1 if you're farther away, you're likely to speak more 16:01:43
2 vaguely or in a code of some sort. 16:01:46
3 And I say that, that's -- the invention 16:01:49
4 disclosed in the patent is similar to what you and I 16:01:57
5 would do as humans. 16:01:59
6 BY MR. REYNOLDS: 16:02:03
7 Q Does the invention do it in the same way 16:02:03
8 humans do it? 16:02:06
9 A Of course not. 16:02:08
10 MR. REEVES: Objection. Form. 16:02:11
11 THE WITNESS: I'm sorry. 16:02:12
12 Of course not. We're humans and they're 16:02:12
13 machines. The hardware is very different. 16:02:16
14 THE COURT REPORTER: I'm sorry. I missed 16:02:16
15 that. 16:02:17
16 THE WITNESS: The hardware is very 16:02:18
17 different. We are humans and they are machines. 16:02:20
18 The hardware is very different. That's what I 16:02:24
19 stated. 16:02:26
20 BY MR. REYNOLDS: 16:02:38
21 Q Who came up with the analogy described in 16:02:38
22 paragraph 36? 16:02:41

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1 A I was asked to address the question in the 16:02:45
2 headline and the label of the section, I came up 16:02:51
3 with the analogy. It's just, like, an easy thing to 16:02:57
4 characterize. 16:03:04
5 Q Are you aware that this analogy bears 16:03:06
6 striking resemblance to an analogy Amazon included 16:03:10
7 in its briefing to the court? 16:03:13
8 A No. 16:03:16
9 Q So you guys each came up with it 16:03:16
10 separately? 16:03:19
11 A Yeah. I -- I've had no exposure to the 16:03:20
12 Amazon documents beyond this case -- well, and 16:03:24
13 related to this case beyond the ones we're looking 16:03:29
14 at right now. 16:03:33
15 Q Does Shin disclose nothing more than 16:05:01
16 collecting information, analyzing information, and 16:05:04
17 presenting results? 16:05:06
18 MR. REEVES: Objection. Form. Outside the 16:05:09
19 scope. 16:05:13
20 THE WITNESS: Can I have a copy of the 16:05:13
21 reference? 16:05:14
22 BY MR. REYNOLDS: 16:05:14

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1 Q It's in the Chat. 16:05:39
2 A I'll grab it in a second. 16:05:42
3 Q For the record, that's Exhibit 1003. 16:05:46
4 A Okay. I finally have it now, and I verify 16:07:04
5 that the reference that I have is -- is the same as 16:07:06
6 the paper copy that I've been handed. 16:07:10
7 Q Thank you. I'll restate the question. 16:07:16
8 Does Shin disclose nothing more than 16:07:21
9 collecting information, analyzing information, and 16:07:23
10 presenting results? 16:07:25
11 MR. REEVES: Objection. Form. Outside the 16:07:27
12 scope. 16:07:27
13 Counsel, are you really asking Dr. Stern to 16:11:05
14 read the entire Shin reference and render an 16:11:07
15 opinion, sitting right here, as to whether it 16:11:10
16 discloses more than -- I forget your question. 16:11:12
17 BY MR. REYNOLDS: 16:11:14
18 Q He can decide how he wants to answer my 16:11:14
19 question. He doesn't need your instruction. 16:11:17
20 A I'm just going to say I don't know, and I'd 16:12:04
21 have to study the document further to render a 16:12:07
22 theory or an opinion, if you wish. 16:12:09

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1 Q But you can't tell without reviewing the 16:12:18
2 document further whether Shin discloses something 16:12:22
3 more than collecting information, analyzing 16:12:24
4 information, and presenting results? 16:12:26
5 MR. REEVES: Objection. Form. Outside the 16:12:28
6 scope. 16:12:30
7 THE WITNESS: No. 16:12:30
8 BY MR. REYNOLDS: 16:12:30
9 Q Can you look at paragraphs 38 to 40 in your 16:12:33
10 declaration, please? 16:12:36
11 A Yes. 16:12:45
12 Q It looks like you discuss hardware 16:12:48
13 components and whether they're conventional? 16:12:50
14 A The components don't have to be hardware. 16:12:56
15 What I'm stating in that section is that the 16:12:59
16 components, either hardware or software, are 16:13:04
17 described at a very high level of functionality 16:13:09
18 without details about how to implement them. 16:13:14
19 Q Where do you discuss software components in 16:13:19
20 those paragraphs? 16:13:21
21 A You're correct; I do not. 16:13:32
22 Q And you don't discuss the combination of 16:13:42

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1 hardware and software components in those 16:13:44
2 paragraphs, right? 16:13:46
3 MR. REEVES: Objection. Form. 16:13:49
4 THE WITNESS: I'm only stating that the 16:13:53
5 components used are conventional with an -- with an 16:13:55
6 accepted practice of 2018. 16:14:04
7 BY MR. REYNOLDS: 16:14:09
8 Q I'm asking about paragraphs 38, 39, and 40, 16:14:09
9 though. 16:14:12
10 A Yes, I know. 16:14:13
11 Q Where do you discuss the combination or any 16:14:14
12 combination of hardware and software components? 16:14:16
13 MR. REEVES: Objection. Form. 16:14:19
14 THE WITNESS: I was only asked to opine 16:14:20
15 upon the components themselves, rather than how they 16:14:22
16 were combined, so I don't talk about that. 16:14:27
17 BY MR. REYNOLDS: 16:15:29
18 Q Can you go to paragraph 53 of your reply 16:15:29
19 declaration, please -- no. I'm sorry -- paragraph 16:15:32
20 57, and I'd like to focus on the sentence at the top 16:15:41
21 of paragraph -- sorry -- page 25 that says: "Basye 16:15:53
22 discloses detecting whispered speech when the speech 16:16:03

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1 'has resonance below a threshold[.]'" 16:16:08
2 Do you see that? 16:16:12
3 A Yes, I do. 16:16:13
4 Q What does "resonance below a threshold" 16:16:14
5 mean? 16:16:17
6 A Could you pass me that document as well? 16:16:25
7 Q I've put in the Chat Exhibit 1208. 16:16:39
8 A Thank you. 16:16:43
9 I'm looking at it now, and indeed, it is 16:17:12
10 the same Exhibit 1208 that you have in the Chat, the 16:17:14
11 hard copy that I have, and now turning to paragraphs 16:17:18
12 52, 58, and 60. 16:17:22
13 What paragraphs 52, 58, and 60 refer to in 16:19:10
14 the Basye reference -- and by the way, that's 16:19:14
15 capital B-A-S-Y-E, and I'm not at all confident that 16:19:21
16 I'm pronouncing the name correctly. 16:19:26
17 But what they refer to is collecting a 16:19:28
18 bunch of patterns -- spectral patterns, frequency 16:19:37
19 patterns of whispered speech, collecting another set 16:19:41
20 of patterns of frequency analysis of non-whispered 16:19:46
21 speech, and training a classifier, and in this case 16:19:51
22 SVM classifier, support vector machine, SVM, to make 16:19:56

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1 a classification decision strictly on the basis of 16:20:05
2 the examples that are presented in the system. 16:20:09
3 Q All right. What is resonance -- let me 16:20:18
4 start over. 16:20:23
5 How do you compare resonance to a 16:20:27
6 threshold, or how does Basye envision comparing 16:20:31
7 resonance to a threshold? 16:20:34
8 MR. REEVES: Objection. Form. 16:20:36
9 THE WITNESS: According to the further 16:20:39
10 disclosure of paragraph 60 of Basye, that disclosure 16:20:46
11 is not talking about comparing the resonance 16:20:52
12 directly to a threshold, but, rather, comparing the 16:20:55
13 probability that that spectral pattern, which 16:20:58
14 includes resonances, is likely to be a spectral 16:21:01
15 pattern corresponding to whisper versus a normal 16:21:05
16 speech sound, non-whispered speech sound. So we're 16:21:09
17 not comparing resonances. We're comparing 16:21:16
18 probabilities. 16:21:19
19 BY MR. REYNOLDS: 16:21:29
20 Q Now I'm even more confused. 16:21:29
21 A Sorry about that. 16:21:30
22 Q Because the part -- no. That happens all 16:21:31

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1 the time. 16:21:33
2 The portion you quote from Basye said -- 16:21:35
3 you mentioned just that Basye discloses detecting 16:21:42
4 whispered speech when, quote -- sorry -- when the 16:21:44
5 speech, quote, has resonance below a threshold, end 16:21:49
6 quote. 16:21:53
7 So it seems if resonance -- if speech has 16:21:53
8 resonance below a threshold, it sounds to me like 16:21:58
9 you're comparing some variable associated with the 16:22:01
10 speech to a threshold, but perhaps I'm mistaken. 16:22:04
11 Could you explain if he's doing that? 16:22:07
12 A No, I think you're not mistaken. 16:22:10
13 MR. REEVES: Objection. Form. 16:22:13
14 THE WITNESS: I'm sorry. 16:22:14
15 I think you're not mistaken -- mistaken. 16:22:15
16 That is what the patent states. 16:22:16
17 The patent goes on to state, in paragraphs 16:22:20
18 59 and 60, that it used the spectral patterns, 16:22:25
19 including the resonances to develop a model that's 16:22:30
20 used by classification -- classification system, and 16:22:32
21 they cite SVM classifier, which was the -- really 16:22:36
22 one of the best state of the art approaches to 16:22:44

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1 classification for that kind of signal, at least at 16:22:46
2 the time of the filing. 16:22:52
3 And then based on the patterns that you 16:22:53
4 see, you look at a lot of different patterns for 16:22:57
5 whispered speech, a lot of different patterns for 16:23:00
6 non-whispered speech, again, without necessarily 16:23:03
7 measuring the values of the peaks and values from 16:23:09
8 the resonance -- from the resonances that were 16:23:13
9 generated. And then you make a decision based on 16:23:15
10 the -- whether it was more likely, whether it was 16:23:19
11 more probable that a particular input speech 16:23:24
12 utterance was whispered or conventional. 16:23:28
13 BY MR. REYNOLDS: 16:23:36
14 Q What would be the units of the threshold in 16:23:36
15 Basye? 16:23:38
16 MR. REEVES: Objection. Form. Outside the 16:23:42
17 scope. 16:23:45
18 THE WITNESS: So these are probabilities, 16:23:45
19 and probabilities are dimensionless. Probabilities 16:23:48
20 would lie between zero and one. 16:23:51
21 BY MR. REYNOLDS: 16:23:58
22 Q Where in Basye does it say that? 16:23:58

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1 A It says, in paragraph 60 in Basye: "For 16:24:02
2 example, a model, such as an SVM classifier, may be 16:24:11
3 trained to recognize when an input speech utterance 16:24:16
4 is whispered using many different training 16:24:20
5 utterances, each labeled either 'whispered' or 'not 16:24:21
6 whispered.'" The -- I'm just going to continue to 16:24:33
7 read. 16:24:35
8 "Each training utterance may also be 16:24:35
9 associated with various feature data corresponding 16:24:37
10 to the respective utterance, where the feature data 16:24:40
11 indicates values for the acoustic and/or 16:24:43
12 non-acoustic [sic] paralinguistic features that may 16:24:46
13 be used to determine if a future utterance was 16:24:48
14 whispered. The model may be constructed...on the 16:24:51
15 training utterances and then disseminated to 16:24:53
16 individual devices...or to server(s)...A speech 16:24:57
17 quality detector...may then use the model(s) to make 16:25:01
18 decisions at runtime as to whether the utterance was 16:25:03
19 whispered." 16:25:06
20 Now, and -- and then it goes on without 16:25:07
21 saying anything relevant to the question. 16:25:10
22 The standard SVM classifier, given two 16:25:13

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1 questions -- given -- given two categories, will 16:25:16
2 assess the probability of one -- one category being 16:25:21
3 present given the data and compare that to the other 16:25:25
4 category being present given the data. And 16:25:29
5 typically, this would be discussed in terms of the 16:25:33
6 likelihood of probabilities or, more commonly, the 16:25:35
7 law of the likelihood of probabilities, and that 16:25:40
8 would be compared to a threshold. 16:25:44
9 Q If you'd turn to paragraph 60, and this is 16:25:57
10 Section 2(D)(3) of your reply declaration, that 16:26:00
11 begins Section 2(D)(3) -- 16:26:08
12 A Yes. 16:26:12
13 Q -- that section contains paragraphs 60 to 16:26:12
14 65. 16:26:16
15 A That's right. 16:26:17
16 Q Okay. 16:26:17
17 What's the purpose of this section? 16:26:17
18 MR. REEVES: Objection. Form. 16:26:23
19 THE WITNESS: The -- this is part of the 16:26:26
20 general discussion that -- asserting that the 16:26:38
21 proposed substitute claim 8 would be obvious given 16:26:44
22 the existing prior art, and the first part we talk 16:26:48

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1 about -- I talk about the disclosures of whisper 16:26:57
2 detection in a couple of specific papers, which 16:27:04
3 we've mentioned, Raitio and also the Chen reference, 16:27:08
4 which I'm sure you have, with some additional 16:27:12
5 references, including the Basye reference that you 16:27:20
6 just asked me about. 16:27:23
7 And then go on to say that all of these 16:27:30
8 suggest that whisper is determined already in the 16:27:32
9 prior art based on distance and peak frequency. 16:27:37
10 And, finally, Section 3 there is concerned with 16:27:42
11 motivation to combine, and we talk about the 16:27:46
12 existence of private communication modes in Chen and 16:28:07
13 Shimomura using -- combined with the methods 16:28:12
14 disclosed for detecting whispers in Raitio and Chen, 16:28:15
15 and this is precisely, in combination, the system 16:28:22
16 that is proposed in the '675 patent and the '337 16:28:26
17 patent for that matter. 16:28:33
18 BY MR. REYNOLDS: 16:28:39
19 Q So the title of that section is Motivation 16:28:39
20 to Combine, right? 16:28:42
21 A That's right. 16:28:44
22 Q So what is -- what is the combination 16:28:44

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1 you're discussing that a POSITA would have been 16:28:48
2 motivated to create? 16:28:51
3 A The combination would have been, on the one 16:28:54
4 hand, detection of distance or estimation of 16:28:56
5 distance and using that to modify the output speech 16:29:03
6 device, and that was disclosed by Shin and Shimomura 16:29:07
7 on one hand. 16:29:12
8 And on the other hand was the detection of 16:29:13
9 whispers, which was disclosed, among other places, 16:29:17
10 through the teachings of -- of Raitio and Chen. And 16:29:25
11 the goal of that was that if the user is 16:29:31
12 whispering -- and this is the same, I'm sure, as for 16:29:36
13 the '337 and '675 patent -- if the user is 16:29:42
14 whispering, you also want to have a private 16:29:47
15 communication established. 16:29:50
16 Q So does the combination of prior art you're 16:29:57
17 referencing include all of those, Shin, Shimomura, 16:30:00
18 Chen, Raitio, Basye, and Jain or some subset of 16:30:07
19 those or which one -- which ones? 16:30:13
20 MR. REEVES: Objection. Form. 16:30:16
21 THE WITNESS: Well, it's stated in 16:30:17
22 paragraph 60 that you would choose one or more of 16:30:20

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1 Raitio, Chen, Basye, and/or Jain to provide the 16:30:26
2 whisper detection with one of the prior art 16:30:32
3 references, most likely Shin or Shimomura, to 16:30:36
4 provide the modification of the output content. 16:30:41
5 In other words, at the end of paragraph 61, 16:31:13
6 I state: "Thus, a person of ordinary skill would 16:31:19
7 have been motivated to configure Shin and 16:31:23
8 Shimomura's devices to detect whisper, and do so by 16:31:25
9 comparing peak-frequency intensity to a threshold as 16:31:28
10 taught by Raitio or Chen, to achieve the benefits of 16:31:32
11 detecting whispered speech." 16:31:35
12 BY MR. REYNOLDS: 16:31:42
13 Q So the combination is either Shin or 16:31:43
14 Shimomura with one or more of Raitio, Chen, Basye, 16:31:45
15 and Jain. Is that -- 16:31:52
16 A Yes. 16:31:55
17 Q Okay. So that's, like, 30 possibilities of 16:31:56
18 combining these references? 16:32:00
19 A I don't know. One from column A and one 16:32:01
20 from column B would be sufficient, and that's stated 16:32:05
21 clearly in -- in the reply declaration. 16:32:10
22 Q So what's column A then? What's in column 16:32:16

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1 A? 16:32:21
2 MR. REEVES: Objection. Form. 16:32:22
3 THE WITNESS: Well, let us suppose, in this 16:32:23
4 analogy, that column A would be Shin or Shimomura 16:32:25
5 and column B would be the various methods disclosed 16:32:29
6 for detecting whisper. 16:32:34
7 BY MR. REYNOLDS: 16:32:39
8 Q Okay. So in paragraph 60 you say, in a 16:32:39
9 parenthetical, Raitio, Chen, Basye, and/or Jain. So 16:32:43
10 typically I would read "and/or" to mean any 16:32:50
11 combination of those references, not just one of 16:32:53
12 each, but any pairing possible. 16:32:55
13 Is that what you meant or did you mean 16:32:58
14 something else? 16:33:00
15 A I meant that one from -- one of the 16:33:00
16 references inside the parens would be sufficient in 16:33:06
17 combination with either Shin or Shimomura. 16:33:10
18 Q Okay. So then we have two options in 16:33:12
19 column A and four in column B? 16:33:14
20 A Right. But you don't have to try them all. 16:33:18
21 Any of them should work. There's no undue 16:33:20
22 experimentation expected. 16:33:25

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1 Q Okay. Which of those eight combinations 16:33:29
2 did you address in paragraph 60 to 65? 16:33:31
3 MR. REEVES: Objection. Form. 16:33:37
4 THE WITNESS: Paragraphs 60 to 65 are 16:33:57
5 intentionally agnostic about which of those I 16:34:02
6 recommended. Paragraph 62 notes that for detecting 16:34:15
7 whispered speech, probably Raitio and Chen would be 16:34:18
8 best, and then you could combine either of those 16:34:24
9 with Shin or Shimomura. 16:34:27
10 So if you're doing combinatorics, that's 16:34:29
11 only four combinations, but any of those should 16:34:33
12 work. 16:34:36
13 BY MR. REYNOLDS: 16:34:39
14 Q In paragraph 61, you quote Shin as saying: 16:34:39
15 "...'[t]here is a growing need to detect whispered 16:34:44
16 speech'..." 16:34:46
17 A Yes. 16:34:50
18 Q Was that -- I'll represent that Shin was 16:34:51
19 published in 2016. 16:34:54
20 Was that true in 2016? 16:34:56
21 MR. REEVES: Objection. Form. 16:35:00
22 THE WITNESS: Are -- are you asking for my 16:35:04

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1 general opinion or something based on the 16:35:06
2 references? 16:35:08
3 BY MR. REYNOLDS: 16:35:08
4 Q Your opinion. 16:35:09
5 A Well, I don't know. It wasn't a problem 16:35:15
6 that I was working on. 16:35:17
7 Q Are you able to determine whether that 16:35:32
8 statement by Chen is correct or not, based on your 16:35:35
9 own background and expertise? 16:35:39
10 A Well -- 16:35:41
11 MR. REEVES: Objection. Form. Calls for 16:35:42
12 speculation. 16:35:52
13 THE WITNESS: I believe that that 16:35:52
14 motivation was included in some of the other prior 16:35:53
15 art references, so that would lead me to expect that 16:35:57
16 it was reasonable, but it wasn't a topic that I 16:35:59
17 addressed personally in my work. 16:36:03
18 BY MR. REYNOLDS: 16:36:07
19 Q But humans were able to detect whispered 16:36:08
20 speech in 2016, right? 16:36:11
21 A That's correct. There are many things that 16:36:15
22 humans can do even today that even the best machines 16:36:17

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1 cannot do well. 16:36:20
2 Q So Chen was talking about, in the context 16:36:21
3 of a machine, there was a growing need to detect 16:36:24
4 whispered speech? 16:36:28
5 A That's why -- 16:36:31
6 MR. REEVES: Objection. Objection. Form. 16:36:31
7 Calls for speculation. 16:36:33
8 THE WITNESS: I will speculate that 16:36:35
9 that's -- well, that was my interpretation, 16:36:38
10 speculative of what Chen had in mind. 16:36:41
11 BY MR. REYNOLDS: 16:36:47
12 Q So from Chen's point of view, the problem 16:36:47
13 was associated with the automated process or 16:36:50
14 electronic process of detecting whispered speech, 16:36:57
15 but the problem was not associated with humans 16:37:00
16 detecting whispered speech; is that fair? 16:37:03
17 MR. REEVES: Objection. Form. 16:37:06
18 THE WITNESS: Yes. 16:37:06
19 MR. REYNOLDS: I'll pass the witness. 16:37:40
20 MR. REEVES: Okay. Can we take a short 16:37:42
21 break? 16:37:44
22 MR. REYNOLDS: Yeah. 16:37:45

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1 THE VIDEOGRAPHER: Stand by. 16:37:48
2 Going off the record. The time is 16:37. 16:37:49
3 (Recess.) 16:37:53
4 THE VIDEOGRAPHER: Back on the record. The 16:42:30
5 time is 16:42. 16:42:31
6 EXAMINATION BY COUNSEL FOR PETITIONERS 16:42:31
7 AND THE DEPONENT 16:42:38
8 BY MR. REEVES: 16:42:38
9 Q Dr. Stern, I just have a few questions for 16:42:40
10 you. Do you recall earlier today discussing the 16:42:41
11 concept of classifying voice based on distance? 16:42:44
12 A Yes. 16:42:46
13 Q I'd like to hand you Exhibit 1212 from the 16:42:48
14 IPR 2025-00673. I'll also mark this as Exhibit 1212 16:42:53
15 is IPR 2025-00 -- I believe it's 565 is the other 16:43:02
16 one. 16:43:08
17 A Okay. 16:43:09
18 Q And I will drop a copy of this in the Chat 16:43:10
19 as well. 16:43:12
20 - - - 16:43:12
21 (Exhibit 1212 was marked for 16:43:12
22 identification.) 16:43:12

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1 - - - 16:43:26
2 BY MR. REEVES: 16:43:26
3 Q On the cover of this document, Dr. Stern, 16:43:26
4 do you see that this is a complaint for patent 16:43:27
5 infringement between SoundClear Technologies LLC as 16:43:34
6 the plaintiff and Amazon.com, Inc., Amazon.com 16:43:36
7 Services LLC, and Amazon Web Services, Inc. as the 16:43:41
8 defendants? 16:43:44
9 A Yes. 16:43:46
10 Q And if you'd turn to the final page, you'll 16:43:46
11 see it's signed by plaintiffs' attorneys in this 16:43:48
12 case. 16:43:54
13 Do you see that? 16:43:54
14 A Yes. 16:43:55
15 Q Can I have you to turn paragraph 63, which 16:44:06
16 is on page 14? 16:44:10
17 A Yes. 16:44:23
18 Q Can you read the first sentence, which I 16:44:24
19 think is about six lines long? 16:44:26
20 A Okay. 16:44:31
21 "On information and belief, one or more 16:44:33
22 components of the Amazon Products and Services is, 16:44:35

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1 employs, or provides a voice-content control method 16:44:39
2 comprising analyzing the acquired voice (e.g., the 16:44:42
3 signal representing the voice sound) to classify the 16:44:46
4 acquired voice as either one of a first voice (e.g., 16:44:50
5 the voice of a particular first person, or a 16:44:53
6 near/close voice) and a second voice (e.g., the 16:44:56
7 voice of a particular second person, or a 16:45:01
8 far/distant voice) based on the distance between the 16:45:05
9 user and the" voice-control content -- "and the 16:45:08
10 voice-content control device." 16:45:12
11 Q Thank you. 16:45:15
12 So that says that the first voice can be a 16:45:16
13 near or close voice, right? 16:45:19
14 A Yes. 16:45:21
15 MR. REYNOLDS: Objection. Form. 16:45:23
16 Foundation. Scope. 16:45:24
17 THE WITNESS: Sorry. Say it again, please. 16:45:27
18 BY MR. REEVES: 16:45:29
19 Q Yeah, I'll redo the question. 16:45:29
20 This says that a first voice can be a near 16:45:32
21 or close voice, correct? 16:45:34
22 MR. REYNOLDS: Same objections. 16:45:36

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1 THE WITNESS: Yes. 16:45:37
2 BY MR. REEVES: 16:45:38
3 Q And it says the second voice can be a far 16:45:38
4 or distant voice, correct? 16:45:41
5 MR. REYNOLDS: Same objections. 16:45:44
6 THE WITNESS: Yes. 16:45:45
7 BY MR. REEVES: 16:45:47
8 Q And this is consistent with your analysis 16:45:47
9 of the claims in these cases, correct? 16:45:50
10 A Yes. 16:45:54
11 MR. REYNOLDS: Same objections. 16:45:55
12 THE WITNESS: Sorry. Yes, it is. 16:45:57
13 MR. REEVES: No further questions. 16:46:01
14 THE VIDEOGRAPHER: Anything further? 16:46:04
15 MR. REYNOLDS: Give me a second, please. 16:46:08
16 No, nothing further. Thank you very much, 16:46:40
17 Dr. Stern. 16:46:44
18 THE WITNESS: Thank you. 16:46:44
19 THE VIDEOGRAPHER: All right. If there's 16:46:45
20 nothing further, this concludes the deposition of 16:46:46
21 Dr. Richard Stern. The time is 16:46. 16:46:48
22 (The following proceedings were held 16:46:48

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1 off the video record:) 16:46:51
2 THE COURT REPORTER: Counsel, may I get 16:46:51
3 your orders, please, starting with you, 16:46:53
4 Mr. Reynolds? 16:46:58
5 MR. REYNOLDS: What's standard? 16:47:00
6 THE COURT REPORTER: Ten business days. 16:47:03
7 MR. REYNOLDS: And rush would be? 16:47:08
8 THE COURT REPORTER: Anything less than 16:47:12
9 that, counting business days. 16:47:13
10 MR. REYNOLDS: Can we get it by, like, next 16:47:19
11 week, by the 14th? 16:47:22
12 THE COURT REPORTER: Yes. Did you want the 16:47:24
13 rough tonight? 16:47:27
14 MR. REYNOLDS: No. 16:47:28
15 THE COURT REPORTER: For you, Mr. Reeves, 16:47:32
16 are you purchasing a copy of the transcript? 16:47:36
17 MR. REEVES: Yeah, we -- we would like the 16:47:38
18 rough and expedited transcript as well. 16:47:41
19 THE COURT REPORTER: On the 14th as well? 16:47:48
20 MR. REEVES: Sure. 16:47:52
21 (Signature having not been discussed, 16:47:53
22 the deposition of Richard Stern, Ph.D. was concluded 16:47:53

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1 at 4:47 p.m. EDT.) 16:47:55
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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC
2
3 I, JOAN V. CAIN, court reporter and Notary
4 Public within and for the Commonwealth of Virginia
5 do hereby certify:
6
7 That Richard Stern, Ph.D., the
8 witness whose deposition is hereinbefore set forth,
9 was duly sworn by me before the commencement of such
10 deposition and that such deposition was taken before
11 me and is a true record of the testimony given by
12 such witness.
13
14 I further certify that the adverse
15 parties, Amazon.com, Inc.; Amazon.com Services LLC;
16 and Amazon Web Services, Inc., were represented by
17 counsel at the deposition.
18
19 I further certify that the deposition of
20 Richard Stern, Ph.D., was conducted remotely over
21 Zoom on WEDNESDAY, April 8, 2026, commencing at
22 12:07 p.m. to 4:47 p.m..

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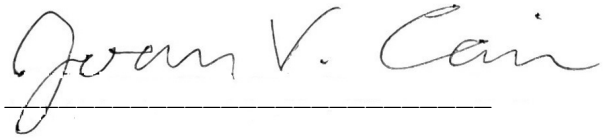
I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 12th day of April 2026.

My Commission Expires: May 31, 2029



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THE COMMONWEALTH OF VIRGINIA
VIRGINIA NOTARY REGISTRATION NO. 107144

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A
a-u-t-o
12:21, 13:2
a1
5:19, 6:9
able
25:11, 28:11, 28:18, 29:11, 36:20, 37:7, 42:5, 42:7, 42:17, 46:8, 46:11, 47:13, 47:22, 49:7, 51:8, 52:1, 52:8, 52:15, 62:22, 69:12, 78:3, 89:14, 103:3, 114:11, 138:7, 138:19
about
8:6, 15:13, 16:4, 18:14, 18:15, 20:10, 20:12, 31:17, 33:22, 54:20, 66:8, 66:11, 67:5, 70:1, 71:15, 76:17, 76:21, 77:14, 78:12, 79:8, 83:21, 86:7, 91:19, 91:22, 92:8, 92:18, 93:10, 93:22, 94:1, 94:15, 97:10, 98:3, 99:5, 99:18, 99:22, 101:1, 102:16, 102:20, 103:7, 103:8, 104:5, 105:16, 106:12, 111:14, 115:4, 115:5, 115:14, 119:8, 119:10, 120:8, 121:19, 125:18, 126:8, 126:16, 128:11, 128:21, 133:1, 133:6, 133:11, 137:5, 139:2, 141:19
above
14:4, 86:13
above-entitled
106:3
absolute
15:4, 34:4, 43:14, 48:22, 70:8
absolutely
51:6
accents
40:20
accepted
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