

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

META PLATFORMS, INC.,)
LG ELECTRONICS INC.,)
and SONY ELECTRONICS)
INC.,)
Petitioners,)
vs.) Case No.
IPR2023-01127
JAWBONE INNOVATIONS,)
LLC,)
Patent Owner.)
_____)

REMOTE DEPOSITION OF
THOMAS W. KENNY, Ph.D.
Palo Alto, California
Friday, April 19, 2024

Reported By:
CATHI IRISH, RPR, CRR, CLVS

Page 2 1 2 3 4 5 6 7 8 April 19, 2024 9 9:58 a.m. 10 11 Remote deposition of THOMAS W. 12 KENNY, Ph.D., with all participants 13 appearing via videoconference, before 14 Cathi Irish, a Registered Professional 15 Reporter, Certified Realtime Reporter, 16 and Notary Public of the State of 17 New York. 18 19 20 21 22 23 24 25	Page 4 1 2 THOMAS W. KENNY, Ph.D., called as a 3 witness, having been duly sworn by a 4 Notary Public, was examined and 5 testified as follows: 6 EXAMINATION 7 BY MR. COWELL: 8 Q. Good morning, Dr. Kenny. 9 A. Good morning. 10 Q. Can you please state your full 11 name for the record? 12 A. Thomas Kenny, K-E-N-N-Y. 13 Q. And where are you located 14 physically right now? 15 A. I'm in Palo Alto at the 16 attorney's office. 17 Q. And that's Paul Hastings' office? 18 A. That's correct. 19 Q. Have you ever been deposed 20 before? 21 A. Yes. 22 Q. How many times? 23 A. It's probably around 15, 12 to 24 15, somewhere in there. 25 Q. Even though you've been deposed
Page 3 1 2 A P P E A R A N C E S: 3 4 PAUL HASTINGS LLP 5 Attorneys for Petitioners 6 200 Park Avenue 7 New York, New York 10166 8 BY: GRACE WANG, ESQ. 9 10 11 FABRICANT LLP 12 Attorneys for Patent Owner 13 411 Theodore Fremd Avenue 14 Suite 206 South 15 Rye, New York 10580 16 BY: RICHARD COWELL, ESQ. 17 18 19 ALSO PRESENT: 20 ORVILLE COCKINGS 21 22 23 24 25	Page 5 1 KENNY 2 before, I'm just going to go over a few 3 ground rules for today's deposition; is 4 that all right? 5 A. That's great. 6 Q. Do you understand today that I 7 will be asking questions and you'll be 8 answering them? 9 A. Yes. 10 Q. From time to time your attorney 11 may object to one of my questions. That's 12 her right, but unless she instructs you 13 not to answer, do you understand that you 14 still have to answer my question? 15 A. Yes. 16 Q. If at any time one of my 17 questions is unclear to you, please let me 18 know and I'll do my best to clarify or 19 rephrase it, but if you do answer it, I 20 will assume that you understood it. Is 21 that fair? 22 A. That's fair. 23 Q. If you want to break at any time, 24 just let me know but I will ask if there's 25 a question pending that you answer the

Page 6 1 KENNY 2 question first. Is that fair? 3 A. That's fair. 4 Q. Are you on any medications today 5 that would prevent you from giving full 6 and truthful testimony? 7 A. No. 8 Q. Is there any other reason you 9 can't give full and truthful testimony 10 today? 11 A. No reasons at all. 12 Q. I see there's a number of 13 materials in front of you. What do you 14 have there? 15 A. So these are fresh copies of my 16 two declarations. In this binder is a 17 collection of the exhibits so the prior 18 art references, and some legal documents. 19 There's the two declarations by the expert 20 representing Jawbone, Dr. Sayeed. There's 21 a collection of other documents so the 22 petition, the preliminary response, the 23 reply and the reply to the reply, the 24 institution decision, things like that, 25 and I think there's two sets of these	Page 8 1 KENNY 2 employment. Monday morning lecture coming 3 up next week is on pressure sensors and 4 microphones. 5 Q. Does that class include signal 6 processing related to microphones? 7 A. So we discuss signals and 8 processing, filtering. We discuss digital 9 processing fourier transforms, the like 10 relationships between bandwidth and signal 11 and noise. The students this week have a 12 lab assignment where they are using the 13 accelerometers on a smartphone as they 14 walk around to capture the acceleration 15 signals that appear due to motion of 16 walking. The signals you see have all 17 kinds of noise added, you know, due to 18 weird movements or background, but if the 19 person is walking with the phone in their 20 pocket, there is within all of that a kind 21 of one hertz periodic signal in all three 22 axes to the accelerometer and the 23 instruction is take a data stream, 10 24 minutes of data, look for that signature, 25 probably most easily in the fourier
Page 7 1 KENNY 2 reflecting the two cases, one the '213 and 3 one the '611. 4 Q. When you said those are fresh 5 copies, do those copies have any markings 6 highlighting or any other annotations? 7 A. None. They were prepared by the 8 firm here based, I think, on your 9 instructions so these are new to me, 10 although I've seen other copies of these 11 documents. 12 Q. Where do you work currently? 13 A. I'm a professor at Stanford 14 University in the mechanical engineering 15 department. 16 Q. Are you currently teaching any 17 classes? 18 A. Spring quarter at Stanford and 19 I'm teaching my course which is an 20 overview of sensors, including things like 21 accelerometers, thermometers, microphones, 22 pressure sensors, gyroscopes. Pretty much 23 the intent of the course is to cover the 24 range of sensors that students and 25 graduates are likely to encounter in their	Page 9 1 KENNY 2 transform of the raw data, and try to 3 write up an algorithm that will count 4 steps. There's one algorithm like that 5 running on your smartphone so it's the 6 students' opportunity to see what it's 7 like to take those raw signals and try to 8 convert that to a step counter. 9 Q. Does your class cover any signal 10 processing on acoustic signals? 11 A. We'll talk about frequency range, 12 bandwidth and some of the filtering you 13 might do with acoustic signals. In fact, 14 we'll refer on Monday rather repeatedly to 15 the lapel mic that I'll be wearing during 16 that lecture and what its characteristics 17 are, how it works. We'll talk about 18 condenser microphones, we'll talk about 19 other kinds of sensors that can pick up 20 acoustic signals and how their signals and 21 noise might present themselves and what 22 you can do in processing to manage all of 23 that. 24 Q. Do you understand that we are 25 here today for a deposition with regard to

Page 10 1 KENNY 2 two IPRs? 3 A. Yes. 4 Q. And one of those IPRs is 5 IPR2023-01084; is that right? 6 A. That's correct. 7 Q. And that refers to U.S. patent 8 number 8,321,213; is that right? 9 A. That's correct. 10 Q. And we're also here for the 11 deposition with respect to another IPR, 12 which is IPR2023-01128; is that right? 13 A. That's correct. 14 Q. And that proceeding is about U.S. 15 patent number 8,326,611; is that right? 16 A. That's correct. 17 Q. Would you agree with me that the 18 grounds of invalidity between the two IPRs 19 are substantially the same? 20 A. For these two IPR in my reports, 21 yes, they are the same references. 22 Q. And each proceeding asserts four 23 grounds of invalidity; is that right? 24 A. I don't mean to complicate 25 things, but the fourth ground shown in the	Page 12 1 KENNY 2 and for certain grounds with more 3 references added; is that right? 4 A. That's correct. Within each 5 ground there's a discussion of a set of 6 individual claims which might rely 7 entirely on Avendano for the features that 8 represent the claimed elements, but the 9 Avendano and Visser are part of all four 10 grounds. 11 Q. And all four grounds are based on 12 obviousness; is that right? 13 A. That's correct. 14 Q. There are no anticipation grounds 15 in your reports; is that right? 16 A. I don't -- in the report I don't 17 believe I in any instance claim that a 18 single reference entirely by itself meets 19 all the limitations of that claim. In the 20 report there are sections where when I 21 describe the limitations of a particular 22 claim, I only talk about the elements from 23 one particular reference, but it's 24 understood the way I've prepared the 25 report that Visser is in combination with
Page 11 1 KENNY 2 table of contents refers to a combination 3 of Avendano, Visser, Bisgaard, Hou and a 4 group of references called the frequency 5 art in this heading, which is listed as 6 Byrne, Burnett and/or Berglund. And just 7 by that grammatical structure there's a 8 ground within this set that could be based 9 just on Byrne or one that's based on 10 Burnett or on Berglund or any pair of 11 those three or all three. So this is 12 maybe semantics but to be clear on the 13 record, those could represent independent 14 grounds depending on how you count them. 15 Q. Okay. 16 A. But they are all grouped in 17 ground four in my report and in the table 18 of contents. 19 Q. And that was what I was going to 20 say. Within your report and within the 21 petition it's labeled grounds 1 through 4; 22 is that right? 23 A. I believe that's correct. 24 Q. And all those grounds are based 25 on the combination of Avendano with Visser	Page 13 1 KENNY 2 Avendano through all four of these 3 grounds. 4 Q. Are all of your obviousness 5 opinions included in your two reports? 6 A. That's always a question I 7 wrestle with a bit. These reports were 8 written almost two years ago. In the time 9 since then I've prepared for depositions 10 on a couple of different occasions. 11 There's also been a number of institution 12 decisions and responses and documents 13 prepared by other parties at various 14 stages. I'm aware of those, I've learned 15 from those, so nothing in any of that has 16 changed my opinions, but I can provide 17 additional explanation based on that two 18 years' accumulated additional information 19 and that may help clarify portions of the 20 report depending on the questions that are 21 asked. 22 Q. Did you yourself conduct a prior 23 art search in connection with these IPRs? 24 A. I looked for some prior art 25 references. The attorneys at that time

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2 which were representing Apple had already

3 done some of their own prior art

4 searching. They shared some of those

5 references with me. I found some and

6 shared back and we worked together to

7 build the report.

8 Q. About how much time did you spend

9 on your own prior art search?

10 A. It was two years ago and sorry,

11 it's going to be hard to give a precise

12 answer. There were -- in addition to

13 these two IPRs, there were a number of

14 other IPRs involving even several other

15 Jawbone patents. I'd say probably 10

16 hours, maybe in the aggregate. I can't

17 parse out which were for these two IPRs.

18 Q. Did you discover the Avendano

19 reference in the course of your own prior

20 art search?

21 A. I don't think so. I can't be a

22 hundred percent sure but I don't think so.

23 Q. Did you discover Visser in the

24 course of your prior art search?

25 A. Again, I can't be a hundred

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2 percent sure but it's unlikely, I would

3 say.

4 Q. What about Bisgaard?

5 A. The same answer. I think most

6 likely that was a reference that the

7 attorneys had located prior to reaching

8 out to me.

9 Q. And how about Hou, H-O-U?

10 A. Most likely that came from the

11 attorneys. I'm actually a little bit less

12 sure in that case but again I apologize,

13 this is two years ago. I had a few other

14 things go on in that period, as I'm sure

15 you can imagine.

16 Q. Of course. I just want to know

17 what you know today.

18 A. Sure.

19 Q. Are you aware of any references

20 that anticipate any claim of the '213

21 patent?

22 A. (Witness perusing document.)

23 So in my report there are no such

24 statements that any single patent

25 anticipates all the elements of any claim.

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2 With reference to claims in the case of

3 the '611 patent, for example, let me make

4 sure I've got that right, we describe the

5 Avendano, Visser, Bisgaard and Hou

6 references and then describe the

7 combination of Avendano and Visser before

8 we begin discussing the individual claims.

9 Q. Are you done with your answer or

10 are you still looking?

11 A. Just so -- just with the first

12 challenged claim of the '611 patent, for

13 example, there are elements of the claim

14 that my report identifies entirely

15 elements from Avendano to meet the

16 limitations, but before the completion of

17 that claim, we begin to incorporate

18 elements of Visser and so, at least as far

19 as my report and the analysis I've done so

20 far, all of the combinations are

21 obviousness combinations throughout my

22 report, and those are the opinions I'm

23 prepared to defend today.

24 Q. My question was -- I understand

25 what's in your report. My question was

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2 are you currently aware of any references

3 that anticipate any claim of either the

4 '213 or the '611 patents?

5 A. Are we focusing on references

6 outside of this group, other references I

7 might have come across?

8 Q. Any references that you're aware

9 of.

10 A. I'm not aware of any references

11 outside of the references listed here that

12 I would consider anticipate the claims of

13 either of the patents.

14 Q. Okay. Now, focusing first on the

15 '213 patent, the proceeding relating to

16 that 1084 is only challenging a subset of

17 the claims in the '213 patent. Do you

18 agree with me on that?

19 A. That's correct, yes.

20 Q. You also filed a declaration on

21 claims 1 to 13 of the '213 patent in a

22 separate IPR, do you recall?

23 A. I believe that's true. For

24 discussion of that IPR today, frankly, I

25 don't think there's a copy of it here. I

Page 18 1 KENNY 2 might be wrong about that but yes, I 3 recall that there was such a thing. 4 Q. Do you recall why there were two 5 IPRs filed for a single patent? 6 A. I believe there were legal 7 reasonings for that, perhaps relating to 8 the way the combinations were presented 9 and the rules of how such things can be 10 packaged together or need to be separate. 11 I don't know the details. 12 Q. And is your answer the same with 13 respect to the '611 patent as well? 14 A. Yes, I think so. There might 15 have been a conversation with the 16 attorneys two years ago about that 17 tactical or logistical decision, I just 18 don't remember what the framework or 19 restrictions were that we were working 20 with them. 21 Q. Are you aware of what the 22 difference in scope is between claim 1 and 23 claim 14 of the '213 patent? 24 A. I haven't looked at claim 1 of 25 that -- of the '213 patent recently with	Page 20 1 KENNY 2 THE WITNESS: The '213 and the 3 '611, unless I'm missing them, I don't 4 think they're in these binders. 5 MS. WANG: Let's go off the 6 record real quick. 7 MR. COWELL: Let's do that. 8 (Discussion off the record.) 9 BY MR. COWELL: 10 Q. Dr. Kenny, after the break, do 11 you now have both the '611 and '213 12 patents in front of you? 13 A. I do, thank you. 14 Q. Now, in your declaration relating 15 to the '213 patent, you opine that claim 16 37 is obvious; is that correct? Starts at 17 about page 86, if that's helpful. 18 A. Um-hum. Yeah, Avendano in 19 combination with Visser render that claim 20 obvious. 21 Q. As part of that you conclude that 22 Avendano's virtual microphones would have 23 approximately similar responses to noise. 24 I'm looking at paragraphs 199 and 200. 25 A. Yes, so in paragraph 199 it says
Page 19 1 KENNY 2 that kind of care. If you'd like me to, I 3 can spend a few moments reviewing it and 4 maybe make a statement about that, but 5 it's not in this report and frankly wasn't 6 part of my preparation for today. 7 Q. Okay. And if I asked you the 8 same question relating to the claims of 9 the '611 patent that are not in this 10 current proceeding, would you have the 11 same answer? 12 A. I'm just looking to see which 13 ones were skipped over. It would be the 14 same answer, I'm sure. 15 (Witness perusing document.) 16 I'm looking through this stack of 17 documents and I think we might not have 18 the two asserted patents here. Of all the 19 things that were included, those might 20 have been left out. 21 MR. COWELL: Counsel, on a break 22 can we get him copies of those? It 23 will be really hard to put them on the 24 screen. 25 MS. WANG: Let's take a break.	Page 21 1 KENNY 2 that a person of ordinary skill would 3 recognize that according to Avendano's 4 configuration, Avendano's virtual 5 microphones would have approximately 6 similar responses to noise. 7 Q. And you didn't have any trouble 8 determining that those microphones would 9 have approximately similar responses to 10 noise; is that correct? 11 A. So the phrase approximately 12 similar response to noise is vague, I 13 would say. The precise boundary between 14 where something is approximately similar 15 or not approximately similar would be hard 16 for me to know but I think in Avendano's 17 cases, the geometric patterns of the two 18 virtual microphones are almost completely 19 opposite to one another so that any 20 possible definition of approximately 21 similar in terms of how those two 22 microphones recognize noise in the far 23 field, which is assumed to be kind of 24 uniformly present and bouncing around, 25 that the two microphones would have,

Page 22 1 KENNY 2 regardless of the details of the 3 orientation being omnidirectional 4 microphones combined to form virtual 5 microphones, would have approximately 6 similar response to noise within the 7 understanding of what that phrase means. 8 There's some boundary between what is 9 approximately similar and what is not, I 10 suppose. I don't know where that is 11 exactly. The Avendano microphones are 12 well within that boundary. So I think in 13 my opinion and a person of ordinary skill 14 in the art would understand that that's 15 the case. 16 Q. And for claim 38, which starts on 17 page 88, here you're also able to conclude 18 that the first virtual microphone and 19 second virtual microphone have 20 approximately dissimilar responses to 21 speech; is that right? 22 A. Again that's true and without 23 attempting to determine the exact boundary 24 between what's approximately similar and 25 what's almost approximately similar,	Page 24 1 KENNY 2 Q. So let's talk about Avendano a 3 bit then. Have you ever seen Avendano 4 before you started working on these IPRs? 5 A. The reference Avendano? 6 Q. Yes. 7 A. I don't think so. 8 Q. Do you consider Avendano to be a 9 VAD? 10 A. VAD being that includes voice 11 activity detection? 12 Q. Right. Let's agree for the 13 purpose of this, VAD means voice activity 14 detector or detection as appropriate; is 15 that okay? 16 A. That's fine. Yes, thank you. So 17 Avendano describes a process of measuring 18 the response, the energy in the two 19 channels of the two virtual microphones 20 and comparing the energy levels as a way 21 of determining the presence or absence of 22 speech, so I think one of ordinary skill 23 would recognize that as voice activity 24 detection. 25 Q. And is Avendano in its totality
Page 23 1 KENNY 2 Avendano microphones, virtual microphones 3 have one that's directed towards the 4 source of speech and one that's directed 5 away, so I would say my opinion and what 6 any person of ordinary skill in the art 7 would interpret is that the Avendano 8 microphones are -- have very dissimilar 9 responses to speech and therefore meet the 10 requirement to be at least approximately 11 dissimilar. 12 Q. So even though you didn't quite 13 understand what approximately similar 14 means, you are able to apply it for this 15 proceeding; is that right? 16 A. That's correct. Again, if you 17 had a whole bunch of examples and they 18 were more or less dissimilar, I think it 19 would be pretty hard to draw the boundary 20 in between the ones that are and the ones 21 that are not exactly between that last 22 pair, but the Avendano and Visser 23 combination are clearly very dissimilar 24 and therefore, they are at least 25 approximately dissimilar.	Page 25 1 KENNY 2 of VAD or are there components within it 3 that form that VAD? 4 A. I think the answer is there's 5 more to Avendano than just voice activity 6 detection. It includes voice activity 7 detection but there's other things that 8 are done that are useful for extracting 9 and conditioning signals and not just 10 turning on an indicator whether there's 11 voice present or absent. 12 Q. And so let's take a look at 13 Figure 4A of Avendano. Do you have that? 14 A. Yes. 15 Q. And that's the figure that you 16 rely on generally for your opinions in 17 this case; right? 18 A. It is referred to repeatedly 19 through my report, yes. 20 Q. So what components within Figure 21 4A make up the VAD of Avendano? 22 MS. WANG: Objection to form. 23 THE WITNESS: So there's the step 24 in Avendano of looking at the signals 25 from the two virtual microphones and

Page 26 1 KENNY 2 computing the energy of the signal in 3 those two channels and using that 4 threshold of that energy to determine 5 the presence of voice activity. That 6 element doesn't function on its own 7 without all the microphones and the 8 construction of the two virtual 9 microphones so the blocks to the left 10 of the energy module 306 and ILD 11 module 308 are -- you need those 12 blocks to take the microphone signals 13 and prepare them for the voice 14 activity detection. So maybe I'm 15 just -- this is a semantics question. 16 The VAD happens in 306 and 308, but 17 the preparation of the signals for the 18 VAD in the prior blocks is necessary 19 in order for 306 and 308 to do their 20 job. 21 BY MR. COWELL: 22 Q. Okay. Let's just walk through 23 how Avendano works as shown in 4A; is that 24 all right? 25 A. Sure.	Page 28 1 KENNY 2 A. That's how they are described in 3 Avendano. 4 Q. And one of ordinary skill in the 5 art would understand that a box labeled 6 with a Z to the negative tau is a delay; 7 is that right? 8 A. I believe so. 9 Q. You're one of ordinary skill in 10 the art. Would you agree that's how you 11 would understand that? 12 A. Yes, that's my understanding. 13 Q. Do those boxes perform any other 14 function other than delaying the 15 respective signals? 16 MS. WANG: Objection to form. 17 THE WITNESS: Would you repeat 18 that? Sorry. 19 BY MR. COWELL: 20 Q. Do those boxes 402 and 404 21 perform any function other than delaying 22 the signal? 23 A. So column 5 of Avendano around 24 line 20 describes this figure as one 25 implementation of the DMA module 302. In
Page 27 1 KENNY 2 Q. Okay. So in Figure 4A, we have 3 acoustic signals received at two 4 microphones which are labeled X 1 and X 2; 5 is that right? 6 A. That's correct. 7 Q. And then those two signals are 8 passed into the DMA module 302; is that 9 correct? 10 A. That's correct. 11 Q. And so within the DMA module, 12 each signal goes through boxes 402 and 13 404; is that right? 14 A. So the signal from the first 15 microphone X 1 goes through box 402. The 16 signal from the second microphone X 2 has 17 some gain applied to it and then it goes 18 through the box 404. 19 Q. And box 402 and 404 are both 20 labeled with Z to the negative tau 2 and 1 21 respectively; correct? 22 A. There's a tau 1 and a tau 2 in 23 those two boxes. 24 Q. And that tells us that those are 25 delay filters; is that right?	Page 29 1 KENNY 2 this implementation the acoustic signal 3 received by the microphones 106 and 108 4 are processed by the DMA module. This -- 5 the exemplary DMA model 302 delays the 6 primary acoustic signal X 1 via delay node 7 404 and DMA module 302 delays -- actually, 8 there's I think a mistake in Avendano in 9 this description that describes both 10 modules with 302, but I think we 11 understand the meaning here, that those 12 modules delay the primary acoustic signal 13 and there's no disclosure of any other 14 effect of those modules on those signals. 15 Q. So Avendano describes those two 16 modules being used solely for delay; is 17 that right? 18 MS. WANG: Objection to form. 19 THE WITNESS: There's no 20 disclosure of any other use in this 21 paragraph referring to this embodiment 22 relative to Figure 4A, that's correct. 23 BY MR. COWELL: 24 Q. And with respect to your opinions 25 relating to the two patents we're talking

Page 30 1 KENNY 2 about, you opine that delay filter 402 is 3 a filter that describes a relationship for 4 speech; correct? 5 A. Yes, so paragraph 137 in my 6 report referring to the claim element of a 7 processing component forming a filter that 8 describes a relationship for speech 9 between the first physical microphone and 10 the second physical microphone, I say that 11 Avendano discloses processing a component 12 that forms a filter that describes a 13 relationship for speech. Specifically in 14 Avendano this filter is a delay node 402 15 formed within the DMA module 302 and 16 describes a relationship for speech 17 between the first physical microphone and 18 the second physical microphone. 19 Q. Do you rely on any other portion 20 of Avendano to be the filter that 21 describes a relationship for speech 22 required by both patents? 23 A. You're asking me about all the 24 claims of both patents? 25 Q. Yes, relating to this one	Page 32 1 KENNY 2 example, Figure 4B, one of several other 3 embodiments in Avendano. There's a block 4 414 D sub Z which describes a delay line 5 or I think a delay filter. That block in 6 that version or that embodiment in 7 Avendano, I think one of ordinary skill 8 would say performs the same function as 9 block 402 in Figure 4A. My report doesn't 10 ascribe that detail to that particular 11 embodiment, but I think one of ordinary 12 skill reading Avendano would recognize 13 that the various embodiments include delay 14 filter locations similar to 402, but that 15 there might be different labels in 16 different embodiments. 17 Q. But your opinions don't rely on 18 those other similar blocks that may exist 19 in Avendano; correct? 20 A. I think that's correct. In my 21 report, we -- I rely on that filter block 22 for that claim element in claim -- claim 23 number 1 of the '213 patent -- sorry, of 24 the '611 patent and claim 14 of the '213 25 patent.
Page 31 1 KENNY 2 specific element. 3 A. Let me just be sure. 4 (Witness perusing document.) 5 In my report there's also a 6 mapping that includes the combination of 7 Avendano and Visser in which Visser also 8 provides a filter that provides a 9 relationship for speech between the two 10 microphones. This is paragraph 143 11 through 148 of my report. 12 Q. But I'm just asking -- continue 13 if you still have more to say. 14 A. Go ahead. 15 Q. I'm aware of that and we'll talk 16 about that in a bit. I just want to ask 17 with respect to Avendano itself. 18 A. And the question again, sorry? 19 Q. The question is do you identify 20 any other portion of Avendano besides 402 21 as the filter that describes the 22 relationship for speech? 23 A. (Witness perusing document.) 24 I'm pausing just in the -- 25 there's a similar structure in, for	Page 33 1 KENNY 2 Q. Turning back to Figure 4A of 3 Avendano, we're still in the DMA module 4 302 and there are -- after the delay 5 blocks, there are two circles with minuses 6 within them. Do you see those? 7 A. Yes. 8 Q. And those are subtracters, is 9 that the right term? 10 A. They could be called summation 11 notes where one element has a minus in the 12 sum and the other not. I think the 13 understanding of Avendano is that there's 14 a subtraction between those elements. For 15 example, the equation shown on line 30, 16 column 5 of Avendano describes the CF, 17 which is the forward cardioid primary 18 signal as consisting of the signal X 1 19 minus the delayed signal X 2 with a gain 20 factor G. So the minus sign is 21 representing that you're subtracting the 22 delayed X 2 signal with gain from the X 1 23 signal in that embodiment. 24 Q. Okay. And I think you already 25 hinted at this. So in coming out of the

Page 34 1 KENNY 2 subtracter on the top there we have the CX 3 signal which is the cardioid forward 4 signal, is that right, or from? 5 A. That's how Avendano describes 6 that output of that summation. 7 Q. On the bottom we have CB, which 8 is the cardioid for the back; is that 9 right? 10 A. Yes, so the backward cardioid, 11 that's correct. 12 Q. When we say cardioid, what does 13 that mean? 14 A. So it's a description of that 15 signal of that node in the circuit. 16 Calling it a cardioid is representing the 17 response that would appear at that node is 18 a function of position of the signal 19 source as represented, I believe, in 20 Figure 6 of Avendano. The left part of 21 Figure 6 shows the two cardioid patterns, 22 one forward and one backward, and what's 23 being represented is the strength of the 24 response is a function of angle from the 25 forward axis all the way around to the	Page 36 1 KENNY 2 A. That's correct. 3 Q. And a null essentially in the 4 zero direction of the CB; correct? 5 A. That's correct. I think one of 6 ordinary skill would understand that this 7 is an idealized representation. A real 8 system with real microphones might have 9 some distortion in these patterns, but 10 that the general shape would be consistent 11 with what's shown here. 12 Q. It would be approximately 13 similar? 14 A. More or less, I would say. 15 There's -- there are things that could be 16 done depending on the delay that's applied 17 in those delay nodes that would change the 18 shape of these patterns. For example, if 19 the delay node applies zero delay, then 20 these patterns would both reflect the 21 difference between a pair of 22 omnidirectional microphones with no phase 23 shift and I think you would see something 24 that was more isotropic. So it depends on 25 the delay chosen with the appropriate
Page 35 1 KENNY 2 reverse axis. 3 Q. Is cardioid generally -- is a 4 cardioid microphone generally a 5 directional microphone? 6 A. I think that's the objective of 7 forming the cardioid. You're trying to 8 create a microphone that has a stronger 9 response in one direction than in other 10 directions. 11 Q. Turning to Figure 6, as you just 12 mentioned, we see the two responses 13 plotted on the same polar plot; right? 14 A. That's correct. 15 Q. And so the CF signal would have 16 the strong response in the zero degree 17 direction; is that right? 18 A. That's correct. 19 Q. And essentially a no response in 20 the 180 degree direction; is that right? 21 A. That's what's represented in this 22 figure, yes. 23 Q. And the CB signal shows a strong 24 response at the 180 degrees; is that 25 right?	Page 37 1 KENNY 2 choice of delay. With the two microphones 3 along the single axis with the voice 4 source also along that axis, you would 5 expect these patterns if everything was 6 chosen properly or something approximately 7 similar to what's here. 8 Q. Okay. And Avendano expects to 9 have one microphone facing the speaker and 10 one microphone facing the back; is that 11 right? When I say the back, the back of 12 the device? 13 A. So one -- Figure 1B in Avendano, 14 which has that physical arrangement, the 15 speaker, the first microphone and the 16 second microphone along a single axis is, 17 I believe, the representation that applies 18 to the embodiments described with respect 19 to Figure 4A. 20 Q. Turning back to Figure 4A, we now 21 have the CF and CB signals coming out of 22 the DMA module 302 and those go into the 23 two frequency analysis modules 304; is 24 that right? 25 A. That's what's shown in the

Page 38 1 KENNY 2 figure, yes. 3 Q. What do the frequency analysis 4 modules do? 5 A. So column 5, around 45, line 45, 6 says the output of the frequency analysis 7 module 304 may comprise a filtered 8 cardioid primary signal and a filtered 9 cardioid secondary signal. There's a 10 later description in the patent of what 11 those filters might be doing. 12 Q. What's your understanding what 13 those filters are doing? 14 A. So there's a number of 15 possibilities described in Avendano. 16 Column 9, for example, says that the 17 frequency analysis module 304 takes the 18 acoustic signals X 1 and X 2 and mimics a 19 cochlea implementation using a filter bank 20 such as a fast fourier transform. 21 Alternately, other filters are described 22 in the patent and a number of 23 possibilities that could be present at 24 that location. 25 Q. What's a cochlea implementation,	Page 40 1 KENNY 2 analysis module 304 and calculates the 3 power estimates associated with the 4 cardioid primary signal and the cardioid 5 secondary signal. In an exemplary 6 embodiment, the power estimates may be 7 mathematically determined by squaring and 8 integrating an absolute value of the 9 output of the frequency analysis module. 10 Q. So in your -- if you were 11 explaining this to one of your students, 12 how would you explain what the energy 13 module is doing? 14 A. So at the very highest level it's 15 estimating the acoustic energy in each of 16 the two cardioid microphone signals. It's 17 doing that by looking at the signal as a 18 function of time, taking it square and 19 integrating over that interval of time to 20 get an estimate, a number that is related 21 to the acoustic energy during that 22 interval in that signal and comparing -- 23 further on comparing those two energy 24 levels to determine whether there's a 25 stronger signal in the voice channel, the
Page 39 1 KENNY 2 what does that mean? 3 A. A cochlea is a structure in your 4 ear, your inner ear that transforms 5 acoustic signals into electrical signals 6 that you perceive. You're listening to 7 me, you're hearing a spectral response 8 associated with the pattern of noise that 9 I'm creating when I speak. And the 10 cochlea has a frequency response that is 11 unique perhaps to each person but in 12 general, there's a pattern of frequencies 13 where there's strong response and other 14 frequencies where there may be lesser 15 response. So I think the idea here is to 16 mimic the sort of typical human cochlea in 17 terms of its ability to transform acoustic 18 signals into perceived sound. 19 Q. Back on Figure 4A, following the 20 frequency analysis module, the signals go 21 to an energy module and what happens in 22 the energy module? 23 A. So back to column 5 of Avendano, 24 around line 50, the energy module 306 25 takes the signals from the frequency	Page 41 1 KENNY 2 forward cardioid relative to the backward 3 cardioid. 4 Q. When you say later on, is that 5 done in the ILD module? 6 A. Yeah, so you calculate in the 7 energy module the calculated energy levels 8 in each channel and the ILD module 9 determines taking a ratio of those two 10 energy levels and as shown in the equation 11 around line 15, and by combining those 12 energy levels in that way, I'm just going 13 to summarize, so further down column 6, it 14 says if the ILD is less than a threshold 15 or greater than a threshold, it uses that 16 as a way to determine the presence or 17 absence of speech. 18 Q. Can you point me to the line you 19 were looking at just so I can follow? 20 A. It's around line 60, column 6. 21 Shows the use of a threshold in comparison 22 with that ILD signal, the ratio that comes 23 from the equation around line 15, and if 24 it's greater than or less than a 25 threshold, for example 0.5, that is

Page 42 1 KENNY 2 associated with the presence or absence of 3 speech. 4 Q. And to finish up how Avendano 5 works, it takes that determination and 6 uses that to cancel noise in the noise 7 reduction system; is that right? 8 A. So now we're getting into the 9 details in the noise reduction system. 10 This may be better described with respect 11 to Figure 3. 12 Q. I wasn't really asking for a 13 detailed description, although if you want 14 to give one, that's perfectly fine. My 15 question is just whether -- we know we 16 have this ILD 0 or 1 and the system uses 17 that to cancel noise in the noise 18 reduction system; is that right at a high 19 level? 20 A. It uses that -- I think it's 21 fair to say that it uses the output of the 22 ILD module and compares the number that 23 comes from that with a threshold and that 24 affects the way the filter and signal 25 processing takes place through the rest of	Page 44 1 KENNY 2 adapted over time. There's some -- 3 there's some information here about the 4 time scale for the adaptation and how you 5 want to go more quickly during the periods 6 when there is not speech present and you 7 would like to slow the Wiener filter down 8 during the periods when there is speech 9 present. I don't know if that's the sort 10 of answer you were look for but as it's 11 described in the Avendano patent, it's 12 adaptive filter that can be applied to the 13 acoustic signals associated with the power 14 spectral density and speech and noise 15 channels to enhance the contrast. 16 Q. Is that the same as the general 17 understanding of what a Wiener filter is 18 in the art? 19 A. I believe the Wiener filter is 20 one of the category of filters that has a 21 fairly general set of applications. In 22 the context of these patents, it's 23 associated with processing the signals 24 from one or more microphones in an 25 acoustic system and it's used to
Page 43 1 KENNY 2 the system and the noise reduction system. 3 Q. As part of the noise reduction 4 system, Avendano uses a Wiener filter; is 5 that right? 6 A. That's one possibility, yes. I 7 don't think it exclusively requires that 8 but it's one way to process the signals. 9 Q. It discloses using a Wiener 10 filter although it allows for other types; 11 right? 12 A. Yes, that's correct. 13 Q. What is a Wiener filter? 14 A. I'm trying to think what would be 15 the right general definition. 16 (Witness perusing document.) 17 So the Wiener filter in this, in 18 Avendano is described in column 7, first 19 as sort of an approximation and then 20 describing the function of how the Wiener 21 filter is implemented. I think in the 22 general sense it's an adaptive filter that 23 is in the system like this, relies on 24 coefficients associated with the power 25 estimates of the input signals can be	Page 45 1 KENNY 2 preferentially enhance certain components, 3 in this case the components associated 4 with speech by applying coefficients that 5 amplify those components in an adaptive 6 method. 7 Q. All I'm asking is what makes a 8 filter a Wiener filter as opposed to any 9 other kind of filter? 10 MS. WANG: Asked and answered. 11 THE WITNESS: (Witness perusing 12 document.) 13 I don't think I'm going to give 14 you a very clean definition of what is 15 a Wiener filter relative to other 16 adaptive filters that are used in the 17 acoustic signal processing world. My 18 understanding is that it's in that 19 general category of adaptive filters, 20 that it takes input coefficients 21 associated with power estimates in the 22 two channels and provides a process 23 for amplifying the portion that's 24 associated with the signal of 25 interest, in this case the voice, that

Page 46 1 KENNY 2 it's adaptive based on the dynamics of 3 the signals that arrive at the inputs 4 and that it's one kind of filter in a 5 category of filters. There may 6 actually be a very particular 7 characteristic that is specifically 8 associated with the way the Wiener 9 filters apply those processes. I'm 10 just not remembering as I sit here 11 today what that specific 12 characteristic is. 13 MR. COWELL: Understood. Why 14 don't we take a 10-minute break. 15 THE WITNESS: Okay. 16 (Recess taken from 11:19 a.m. to 17 11:27 a.m.) 18 BY MR. COWELL: 19 Q. I'd like to turn to Visser now, 20 Dr. Kenny. 21 A. Okay. 22 Q. Did you ever see Visser before 23 working on this case? 24 A. I don't believe so. 25 Q. Would you agree with me Visser is	Page 48 1 KENNY 2 Q. Taking a look at Figure 10, 3 within the context of Visser, what is 4 Figure 10 describing? 5 A. So column 17 of Visser around 6 line 30 is the text describing Figure 10, 7 which is one embodiment of the ICA or BSS 8 processing function, and just describes 9 this architecture is well suited for 10 allowing the speech processing from a pair 11 of microphones. The cross filters are 12 applied to each of the input signals to 13 produce a channel of separated signals U 1 14 and another channel of separated signals U 15 2. Channel 630 in this illustration is 16 the speech channel, contains predominantly 17 desired signals that are, I think, 18 associated with speech, and channel 640 19 contains predominantly noise signals. 20 Q. So I think you may have mentioned 21 it but what does ICA stand for? 22 A. Through this patent, ICA is, I 23 believe, independent component analysis 24 filtering. Let me look at the first 25 sentence of that just to be sure. Yeah,
Page 47 1 KENNY 2 directed to improving a speech signal 3 extracting it from noisy environment? 4 A. So column 1 of Visser under field 5 of the invention says the present 6 invention relates to processes and methods 7 for separating a speech signal from a 8 noisy acoustic environment. 9 Q. Is that a yes? 10 A. Yeah, I think that's a yes. 11 Q. Take a look at Figure 1 of 12 Visser. And that's setting out the 13 general high-level process of the entire 14 Visser reference; is that right? 15 A. Um-hum, that's correct. 16 Q. And now you, if I understand 17 correctly, you focus in on what's 18 described in Figure 10 of Visser for your 19 opinions. I'll give you a moment to catch 20 up. 21 A. I think it's fair to say that 22 Figure 10 is -- appears in more than a few 23 locations in my two reports and 24 specifically the description of the two 25 cross filters that are within Figure 10.	Page 49 1 KENNY 2 column 9 around 20. 3 Q. What does BSS stand for? 4 A. (Witness perusing document.) 5 All the way back in column 2 -- 6 sorry for taking time, I just want to be 7 sure I didn't misstate this -- the BSS is 8 a blind source separation process. 9 Q. What's the difference between ICA 10 and BSS? 11 A. (Witness perusing document.) 12 Sorry for the delay here. I 13 think the right answer to your question 14 is -- I just want to be sure here -- I 15 think the independent component analysis 16 method is a kind of BSS, it's kind of 17 within the category of blind source 18 separation method processes. It's a 19 particular version of that as described in 20 column 3 around line 15. The paragraph is 21 describing the ICA process generally known 22 in the field and because the ICA technique 23 doesn't require information on the source 24 of each signal, it is known as a blind 25 source separation method. I think it's

Page 50 1 KENNY 2 within the category of the BSS and I took 3 some time to read through the rest of 4 what's here. I think that's consistent 5 with the way ICA and BSS are referred to 6 through the text of the Visser patent. 7 Q. I appreciate that explanation. 8 If we look back at column 17, line 29 9 where you were just reading a few 10 questions ago, let me know when you're 11 there. 12 A. Um-hum. 13 Q. It says Figure 10 illustrates one 14 embodiment 600 of an ICA or BSS processing 15 function. Is that sentence telling us 16 that it's one function, you could call it 17 either ICA or BSS? 18 A. Again, I think ICA is a 19 particular embodiment of a BSS. There 20 might be others within the family of BSS 21 that are not described as ICA. 22 Q. Is Figure 10 -- I guess maybe a 23 simpler question. Strike everything. 24 Is Figure 10 showing us an ICA 25 process?	Page 52 1 KENNY 2 A. Visser describes those as cross 3 filters. 4 Q. Are those Wiener filters? 5 A. (Witness perusing document.) 6 So Visser doesn't describe those 7 as Wiener filters explicitly. With 8 respect to Figure 11, there's a paragraph 9 most of the way down in column 20 that 10 describes the post-processing filters in 11 Figure 11 as Wiener filters, or at least 12 that those could be Wiener filters to 13 provide additional speech processing to 14 remove the remaining levels of background 15 noise after the completion of the cross 16 filtering process. So from what's here, 17 the post-processing filters could be 18 Wiener filters. The spec of the patent 19 doesn't describe the cross filters as 20 Wiener filters explicitly. There's a 21 lengthy description of all the things that 22 might be taking place in the cross 23 filters. I wouldn't know for sure whether 24 it's possible for one of ordinary skill to 25 consider a Wiener filter as part of the
Page 51 1 KENNY 2 MS. WANG: Objection to form. 3 THE WITNESS: I believe so, yes. 4 BY MR. COWELL: 5 Q. And Figure 10 is part of the 6 overall signal separation process that 7 Visser is disclosing; is that right? 8 A. (Witness perusing document.) 9 Sorry, yes, that's correct, 10 Figure 10 is describing a portion of the 11 process that I think is outlined in Figure 12 9, process 500. 13 Q. And that would be -- would that 14 be part of the signal separation process 15 that's shown in a box in Figure 1? 16 MS. WANG: Objection, form. 17 THE WITNESS: Yes, that's 18 correct. 19 BY MR. COWELL: 20 Q. Turning back to Figure 10, we see 21 on Figure 10 there's two boxes labeled 22 W 21 and W 12; right? 23 A. That's correct. 24 Q. And those are filters, if I 25 remember correctly; correct?	Page 53 1 KENNY 2 cross filters or not. 3 Q. Do you know if denoting a filter 4 with the prefix W would connote to a 5 person of skill in the art that it's a 6 Wiener filter? 7 A. (Witness perusing document.) 8 So I didn't make that assumption 9 when I read this patent. I agree now that 10 you've asked the question that that could 11 be true. The description of what the 12 cross filters are doing through columns 18 13 and 19, as I said, is consistent with some 14 of the description of what a Wiener filter 15 is from the Avendano patent, so I think 16 the answer is possibly, yes, but it would 17 depend on the particular experience of 18 that person whether they maybe have used 19 those filters extensively and have adopted 20 that shorthand. As far as I remember 21 reading Visser, it doesn't state that 22 explicitly but that could be a strong 23 implication. 24 Q. Okay, I understand. I want to 25 turn now to your combination of Avendano

Page 54 1 KENNY 2 and Visser. So I'm going to refer to your 3 declaration for the '213 patent, the 1084 4 proceeding, if that's okay with you. 5 A. Sure. 6 Q. And as we're going through this, 7 if you think anything is different between 8 the '213 and the '611 patent, can you 9 please just point that out to me? 10 A. Okay. 11 Q. So let's go to paragraph 120. 12 Are you there? 13 A. Yes. 14 Q. Right in the middle of the page 15 here we have a modified Figure 4A of 16 Avendano that you've created; correct? 17 A. That's correct. 18 Q. And looking at the figure, you've 19 added Visser's cross filter W 21 and 20 Visser's cross filter W 12 into Avendano. 21 Is that a fair reading? 22 A. That's a fair description of this 23 annotated Figure 4A representing one way 24 of combining the cross filters with the 25 disclosure of Avendano.	Page 56 1 KENNY 2 be a little inartful, but one of ordinary 3 skill would know how to construct that 4 architecture based on the disclosures of 5 the two patents. 6 Q. Okay. So what we're looking at 7 right now is the combination but with a 8 finite impulse response; is that right? 9 A. That illustration is consistent 10 with a finite impulse response 11 implementation of the cross filters. 12 Q. Other than the two ways you've 13 illustrated that you could implement those 14 cross filters, is there anything else in 15 your combination you're proposing that's 16 not shown in this figure? 17 A. So in general, one of ordinary 18 skill would look at the disclosure of 19 Visser and the disclosure of Avendano and 20 consider a variety of ways of implementing 21 the improved filters from Visser to 22 improve the performance of the system when 23 it's combined. I don't want to say that 24 there's only two possible ways to 25 implement cross filter architecture into
Page 55 1 KENNY 2 Q. Does this annotated figure show 3 the modification, slash, combination that 4 you're proposing for Avendano plus Visser? 5 A. It's an example of a proposed 6 modification. I would say one of ordinary 7 skill would understand that the cross 8 filters could be implemented in a format 9 that is representing what is a finite 10 impulse response architecture as described 11 in Visser or it could be implemented with 12 a infinite impulse response architecture 13 that you would change a few of the wire 14 connections in that diagram around, but 15 one of ordinary skill would know how to do 16 that. So for example, if the intent was 17 to implement the infinite impulse response 18 architecture, the outputs of cross filters 19 W 21 and W 12 would be connected back to 20 the inputs to those cross filters that 21 would be the outputs of the two delays 22 from Avendano, in that kind of a, call it 23 a crisscross arrangement. Drawing it here 24 would be complicated. You would have 25 lines crossing over each other. It might	Page 57 1 KENNY 2 the system of Avendano. There could be 3 more and one of ordinary skill would 4 consider those options. Visser provides 5 several pages of description of different 6 embodiments of the IIR and FIR filters 7 that one might consider, both interior 8 details and the way they interact, so 9 there's a broad range of possibilities 10 that one of ordinary skill would 11 appreciate and consider. What's shown in 12 the report is, I think, one example. It's 13 I'd say chosen mostly because it's the 14 most easily drawn and perhaps and useful 15 for supporting the conversation, but a 16 person of ordinary skill would understand 17 that there's a lot of options consistent 18 with the detailed description of Visser. 19 Q. I just want to know -- what's 20 disclosed in your report is what I'm 21 asking about right now. And other than 22 essentially dropping in those two cross 23 filters, however they are implemented, are 24 you proposing to take anything else from 25 Visser and put it into Avendano?

Page 58 1 KENNY 2 MS. WANG: Asked and answered. 3 THE WITNESS: I think there's 4 lots of possibilities within those two 5 boxes, the cross filters associated 6 with the lengthy description in 7 Visser, and there's at least two 8 possibilities for how those boxes 9 would be connected into the 10 architecture of Avendano. It could be 11 more. The ones I've shown, so I do 12 show Figure 10 with the cross filters 13 in the infinite impulse response 14 arrangement and in the case of the 15 annotated Figure 4A of Avendano, I 16 show the cross filters implemented in 17 a finite impulse response arrangement. 18 Those are examples that meet the 19 limitations of the claims, but a 20 person of ordinary skill would 21 certainly consider other possibilities 22 based on the lengthy disclosure of 23 Visser. 24 BY MR. COWELL: 25 Q. But that's not my question, sir.	Page 60 1 KENNY 2 both considered as options that are 3 explicitly disclosed in the report. 4 If the question is am I implementing 5 or considering implementation of other 6 elements of Visser -- 7 (Witness perusing document.) 8 I'm looking through the other 9 claims in my report and looking for 10 places where Visser is explicitly 11 included to make sure. 12 (Witness perusing document.) 13 Just to be clear, I'm looking for 14 places where the voice activity 15 detection that's in Visser might have 16 been used to support my arguments and 17 I don't believe I explicitly rely on 18 the VAD in Visser to meet the 19 limitations where that's required. So 20 I think without wasting a lot more 21 time leafing through, I think the 22 answer to your question is the 23 components of Visser that I rely upon 24 for my opinions are associated with 25 Figure 10 and the structures within
Page 59 1 KENNY 2 I understand all that. Let me think of a 3 way to ask it that I think will make this 4 clear. 5 Accepting for the purposes of 6 this question your contention that the 7 cross filters could be implemented in any 8 number of ways, besides the cross filters 9 themselves and the necessary connections 10 for them, is there anything else you're 11 pulling from Visser to put into Avendano? 12 MS. WANG: Objection to form. 13 THE WITNESS: So I agree, I think 14 admitting that the details within the 15 W 21 box and the W 12 box that I'm 16 showing could be a range of choices 17 within those boxes, and there's at 18 least two ways that those boxes could 19 be connected to the disclosure of 20 Avendano, either in the finite impulse 21 response arrangement that I show in 22 that annotated Figure 4A from Avendano 23 or looking at the feedback version, 24 the infinite impulse response 25 consistent with Figure 10, those are	Page 61 1 KENNY 2 Figure 10, and the description of what 3 goes on inside of the cross filters 4 and components around them. 5 BY MR. COWELL: 6 Q. Okay. 7 A. That's more in line with the 8 question you're asking but please, let me 9 know. 10 Q. Why don't I re-ask it just so 11 it's all clear because I know you spent a 12 lot of time making sure your answer was 13 correct, which I appreciate. 14 Other than the cross filters and 15 the description of what could be within 16 the cross filters and how the cross 17 filters may be connected, do you rely on 18 any other components of Visser for your 19 opinion? 20 MS. WANG: Objection to form. 21 THE WITNESS: I don't think 22 there's any explicit references to 23 other elements of the entire system of 24 Visser in support of my opinions. 25 Just to be clear though, one of

Page 62 1 KENNY 2 ordinary skill would read the entirety 3 of Visser and think about what's 4 taught in Visser when thinking about 5 ways that one might combine the 6 features in order to obtain the 7 combined benefits of the two systems. 8 There's a lot of teaching in Visser 9 that would be on the table, but my 10 report doesn't explicitly rely on any 11 of those other components in support 12 of my positions. 13 BY MR. COWELL: 14 Q. So the combination you're 15 proposing is Avendano with those cross 16 filters added as you described several 17 times now; is that about right? 18 MS. WANG: Objection to form. 19 THE WITNESS: Yeah, the 20 combination that I'm referring to when 21 discussing the Avendano plus Visser 22 combo is the majority of the Avendano 23 system with cross filters as taught by 24 Visser as a component to be added into 25 that system or the details of how it's	Page 64 1 KENNY 2 of the disclosure of Avendano is 3 associated with Figure 1B because the 4 math is simpler, makes it easier to 5 provide a compact description of the 6 features and benefits, but the 7 arrangement in 1B and 1A is 8 contemplated and could be implemented 9 based on these disclosures. 10 BY MR. COWELL: 11 Q. In your combination are you 12 proposing to change the orientation or the 13 arrangement -- I'm sorry, let me strike 14 that. 15 In your combination are you 16 proposing to change the arrangement of the 17 microphones from how it's disclosed in 18 Avendano? 19 A. I don't think so. I think the 20 disclosure of Avendano is -- includes 21 quite a range of arrangements, so outside 22 of within the scope of what's described by 23 Avendano I think covers what I would 24 consider for the combination. 25 Q. Let's turn to I believe it's
Page 63 1 KENNY 2 added, there's some options in 3 variability, including architecting as 4 a infinite impulse response or a 5 finite impulse response filter at 6 least, maybe more. 7 BY MR. COWELL: 8 Q. In this Avendano/Visser device, 9 with the microphones, they would still be 10 positioned as they are described in 11 Avendano; is that right? 12 MS. WANG: Objection to form. 13 THE WITNESS: (Witness perusing 14 document.) 15 Avendano has Figure 1A and 1B as 16 possible arrangements for the two 17 microphones. Figure 1A shows what 18 looks like a hand-held cell phone of 19 around 10 years ago where there's a 20 primary microphone and a secondary 21 microphone and the axis of the 22 speaker's voice, their mouth and the 23 two microphones is not aligned along a 24 single axis. Figure 1B shows that 25 alignment along a single axis. A lot	Page 65 1 KENNY 2 paragraph 143 of your declaration and 3 again I'm looking at the '213, but if 4 there's any differences between that and 5 the '611, please point them out. 6 Actually, let's start at paragraph 137 7 rather. 8 A. Okay. 9 Q. A couple pages before. 10 A. Um-hum. 11 Q. If I understand your combination 12 correctly, you propose two different ways 13 that the limitation forming a filter that 14 describes the relationship for speech can 15 be met by your combination; is that right? 16 MS. WANG: Objection to form. 17 THE WITNESS: I believe that's 18 correct, yes. 19 BY MR. COWELL: 20 Q. So the first one you set out here 21 is that that filter describing the 22 relationship for speech would be delay 23 node 402 as you state in paragraph 138; 24 right? 25 A. That's correct.

Page 66 1 KENNY 2 Q. But you also realize the Board 3 may not agree with you that that delay 4 node would be a filter that describes the 5 relationship for speech and so you added 6 in Visser; is that right? 7 A. Visser was added in in the 8 version of this report written almost two 9 years ago before any commentary from the 10 Board was on the record. So it wasn't 11 because of the Board's commentary, it was 12 the opinions presented almost two years 13 ago prior to any Board commentary. 14 Q. Let's take a look at paragraph 15 143. So here you say to the extent that 16 Avendano alone does not describe that the 17 processing component forms a filter that 18 describes a relationship for speech 19 between the first physical microphone and 20 the second physical microphone, it would 21 have been obvious to modify Avendano's 22 system in view of Visser to include such a 23 feature. 24 Do you see where it says that, 25 sir?	Page 68 1 KENNY 2 were a thing that a person of ordinary 3 skill would consider combining with the 4 system of Avendano to provide the 5 characteristics that would be desirable. 6 Q. So when you wrote paragraph 143 7 though, you were aware that someone may 8 contend that Avendano alone does not 9 describe forming the filter that describes 10 the relationship for speech? 11 MS. WANG: You can answer. 12 BY MR. COWELL: 13 Q. Is that right? 14 A. As with every other paragraph in 15 the report, someone might disagree with 16 every paragraph one by one or any single 17 paragraph or the entirety. At least one 18 expert I know on the record more recently 19 disagrees with me on some of these 20 paragraphs, but I wouldn't say that at 21 that particular moment that I was 22 especially concerned with the Board on 23 that matter. It was more that the 24 characteristics of Visser's filters would 25 be interesting for a person of ordinary
Page 67 1 KENNY 2 A. Yes. 3 Q. So when you wrote this report, 4 you were cognizant that the Board may not 5 agree with you that 402 was the necessary 6 filter; is that right? 7 MS. WANG: Objection to form. 8 THE WITNESS: I suppose every 9 paragraph in the report is written in 10 the context that the Board may have a 11 different opinion than my opinion. 12 I'm offering my opinion. So I don't 13 think this is special in that regard. 14 BY MR. COWELL: 15 Q. So is that a yes? 16 A. You know, I would say every 17 paragraph in my report I suppose is 18 written with the awareness that the Board 19 might disagree with any paragraph in the 20 entire report, this being one of hundreds. 21 In my mind it wasn't, I think, 22 particularly singled out for that reason. 23 We threw out this ground, we considered 24 the combination of Avendano and Visser, 25 and the properties of the Visser filters	Page 69 1 KENNY 2 skill in the art when considering the 3 construction of the virtual microphones, 4 and that as discussed in some of these 5 later paragraphs, the opportunity for the 6 filters to be adaptive, allowing the 7 performance of the system to be adjusted 8 in response to the particular user's 9 speech or the acoustic environment, would 10 be attractive to one of ordinary skill in 11 this context and would consider applying 12 them. 13 Q. You knew when you were writing 14 this report that you had to find a 15 teaching in the prior art that disclosed 16 forming a filter that describes your 17 relationship for speech, correct, in order 18 to prove the claim obvious; correct? 19 MS. WANG: Objection to form. 20 THE WITNESS: So the general 21 assignment I was asked to complete was 22 to consider the claims of the '213 23 patent and the prior art references 24 that we considered in combination and 25 look for evidence that the claims of

Page 70 1 KENNY 2 the '213 patent were anticipated, or I 3 would say rendered obvious by the 4 combinations of the elements in the 5 prior art references. And in my 6 report I present a number of examples 7 of elements from Avendano, from 8 Visser, from Bisgaard and Hou and the 9 other references that show that the 10 limitations of the '213 existed in the 11 prior art. I think that's the general 12 exercise. 13 BY MR. COWELL: 14 Q. Right. And so specifically as I 15 just asked but I don't think you answered, 16 you understood that you had to find this 17 limitation 14 E disclosed in the prior 18 art; correct? 19 MS. WANG: Objection to form. 20 THE WITNESS: I think my 21 assignment was to look for such things 22 and if I find them, then I find them. 23 I might not find them in some cases 24 and then my opinion would be that the 25 elements were not anticipated. It	Page 72 1 KENNY 2 a disclosure in the prior art forming a 3 filter that describes your relationship 4 for speech; is that right? 5 A. That's correct. 6 Q. And as we discussed earlier, you 7 proposed Avendano disclosing it alone as 8 well as an alternative that Avendano plus 9 Visser discloses it; is that right? 10 A. That's a fair description of this 11 part of my report. 12 Q. So it included the 13 Avendano/Visser part as in 143 that this 14 element would be met even if Avendano 15 alone did not describe forming the filter 16 that describes the relationship for 17 speech; is that right? 18 MS. WANG: Objection to form. 19 THE WITNESS: Paragraph 143 says 20 to the extent that Avendano alone does 21 not describe that the processing 22 component forms a filter that 23 describes the relationship for speech, 24 it would have been obvious to modify 25 Avendano's system in view of Visser to
Page 71 1 KENNY 2 isn't my job to find them. My job is 3 to look for them and if I find them, 4 then that forms the basis of my 5 opinion for the invalidity of these 6 claims, but it isn't -- it's not a 7 march to the death. The elements are 8 present or absent. In this case they 9 are obviously present. I'm sorry, I'm 10 just sort of parsing your question 11 because it implied that my task was to 12 find the elements and I think my task 13 is to look for them and if I find 14 them, that I report on that. If they 15 are not present, it isn't my job to 16 march on forever and ever and ever. 17 My job is to look for them and if I 18 find them, I report on them. 19 BY MR. COWELL: 20 Q. Okay, I understand the 21 distinction you're making. 22 Let me re-ask it under that lens 23 that now you've provided for me. 24 You understood with respect to 25 limitation 14 E that you were looking for	Page 73 1 KENNY 2 include such a feature. 3 BY MR. COWELL: 4 Q. Is that a yes? 5 A. I think so. 6 Q. Now, in the Avendano/Visser 7 combination, let me make sure I have it in 8 front of me, and I'm looking at 144 here. 9 You say each of Visser's cross filters 10 W 12 and W 21 describes a relationship for 11 speech between a first physical microphone 12 and a second physical microphone. Do you 13 see that? 14 A. Yes. 15 Q. What is that relationship for 16 speech? 17 A. So the Visser cross filter W 12 18 would be applied to Avendano's second 19 signal to further increase the speech 20 content in the first virtual microphone 21 and the complementary filter could be 22 applied to the other signal to decrease 23 speech content in that microphone. 24 Further, Visser discloses that the 25 different physical microphones may have

Page 74 1 KENNY 2 different responses to speech. Depending 3 on the location of the audio source and 4 since the microphones, quoting Visser, 5 since each of the microphones is separate 6 from every other microphone, they will 7 generate somewhat different composite 8 signals. For example, the relative 9 content of noise and speech may vary as 10 well as the timing and delay for each 11 sound source. So the filters are 12 addressing the different composite signals 13 which include the relative content of 14 noise and speech as well as the timing and 15 delay for each sound source. 16 Q. Where do you get that last part? 17 I'm having trouble seeing it. 18 A. It's right at the end of 19 paragraph 146. 20 Q. Oh, I see it. What is the 21 relationship that's described in those 22 filters then? 23 MS. WANG: Asked and answered. 24 THE WITNESS: In that sentence 25 there's relative content of noise and	Page 76 1 KENNY 2 delay the digitized sound signal, 3 close quote, received by each of 4 Avendano's physical microphones and 5 then, quote, again by the amount of 6 time used by a sound signal to 7 propagate in the zero degree azimuth 8 direction from the front microphone to 9 the rear microphone in order to 10 account for the amount of time used by 11 a sound signal to propagate from the 12 front to rear microphone. 13 BY MR. COWELL: 14 Q. So is that a yes? 15 A. So that, we're referring to 16 Avendano's teaching that the delay applied 17 to the cross -- to the signals at Avendano 18 would be consistent with the time used by 19 the sound to propagate from the front 20 microphone to the rear microphone. 21 Q. And that's the modification 22 you're making from Avendano/Visser to 23 Avendano/Visser/Bisgaard; is that right? 24 MS. WANG: Objection to form. 25 THE WITNESS: So just looking
Page 75 1 KENNY 2 speech between the two channels, 3 between the two microphones as well as 4 the timing and delay of the signals 5 for each sound source. There's -- all 6 of those are part of what could be 7 considered to be a relationship for 8 speech. 9 BY MR. COWELL: 10 Q. I'd like to skip ahead now to 11 paragraph 229. Here we're talking about 12 adding in Bisgaard as well; right? 13 A. That is correct. 14 Q. Now, is it correct that what 15 you're taking from Bisgaard is the amount 16 of delay to apply in the Avendano/Visser 17 system? 18 MS. WANG: Objection to form. 19 THE WITNESS: So paragraph 234 as 20 an example of applying Bisgaard's 21 teaching regarding delays to 22 Avendano's system, a person of 23 ordinary skill in the art would have 24 found it obvious to configure each of 25 Avendano's delay nodes to, quote,	Page 77 1 KENNY 2 through the claims in that ground. 3 Can I have that question again 4 just to be sure? 5 BY MR. COWELL: 6 Q. The modification you're making to 7 Avendano/Visser that makes it into 8 Avendano/Visser/Bisgaard is to implement 9 the amount of delay from Bisgaard into 10 Avendano as delay nodes 402 and 404; is 11 that right? 12 MS. WANG: Objection to form. 13 THE WITNESS: I think that's 14 correct for the claims in this ground, 15 that the teaching of Bisgaard 16 regarding the time delay is what's 17 being incorporated into the Avendano 18 and Visser combo. 19 BY MR. COWELL: 20 Q. And therefore, is it true that 21 you're not taking any of the other 22 components of Bisgaard and putting them 23 into the Avendano/Visser combination? 24 MS. WANG: Objection to form. 25 THE WITNESS: I think that's

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1 KENNY
2 correct.
3 MR. COWELL: Why don't we take
4 about a five-minute break.
5 THE WITNESS: All right.
6 (Recess taken from 12:24 p.m. to
7 12:30 p.m.)
8 MR. COWELL: So those are all my
9 questions so I pass the witness.
10 MS. WANG: Sorry, give me five
11 minutes to look at my notes. I may or
12 may not have any redirect.
13 (Recess taken from 12:30 p.m. to
14 12:35 p.m.)
15 (Continued on next page.)
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1 KENNY
2 MS. WANG: I have no questions so
3 we can conclude.
4 MR. COWELL: Great.
5 MS. WANG: Let's go off the
6 record, Cathi.
7 (Time noted: 12:35 p.m.)
8
9
10 THOMAS W. KENNY, PH.D.
11
12 Subscribed and sworn to before me
13 this ____ day of _____, 2024.
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15 _____
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1 KENNY
2 C E R T I F I C A T E
3 STATE OF NEW YORK)
4 : ss.
5 COUNTY OF NASSAU)
6
7 I, CATHI IRISH, a Registered
8 Professional Reporter, Certified Realtime
9 Reporter, and Notary Public within and for
10 the State of New York, do hereby certify:
11 That THOMAS W. KENNY, PH.D., the
12 witness whose deposition is hereinbefore
13 set forth, was duly sworn by me and that
14 such deposition is a true record of the
15 testimony given by the witness.
16 I further certify that I am not
17 related to any of the parties to this
18 action by blood or marriage, and that I am
19 in no way interested in the outcome of
20 this matter.
21 IN WITNESS WHEREOF, I have hereunto
22 set my hand this 19th day of April, 2024.
23
24 
25 CATHI IRISH, RPR, CRR, CLVS

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1 KENNY
2 ----- I N D E X -----
3 WITNESS EXAMINATION BY PAGE
4 THOMAS KENNY MR. COWELL 4
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1 KENNY
 2 *** ERRATA SHEET ***
 3 NAME OF CASE: Meta Platforms vs. Jawbone
 4 Innovations
 5 DATE OF DEPOSITION: April 19, 2024
 6 WITNESS: Thomas W. Kenny, Ph.D.

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19
 20 _____
 THOMAS W. KENNY

21
 22
 23 Witness and sworn to before me
 24 this ____ day of _____, 2024.

25 _____
 (Notary Public) My Commission Expires:

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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