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# Transcript of Arthur W. Kelley, Ph.D.

**Date:** June 21, 2019

**Case:** Intel Corporation -v- Qualcomm Incorporated

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Intel v. Qualcomm  
Exhibit 1028  
IPR2018-01152

Transcript of Arthur W. Kelley, Ph.D.  
Conducted on June 21, 2019

<p>1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 4 - - - - - x 5 INTEL CORPORATION : IPR2018-01152; -01153; 6 Petitioner : -01154; -01240 7 vs. : 8 QUALCOMM INCORPORATED : U.S. Patent No. 8,698,558 9 Patent Owner. : 10 11 - - - - - x 12 Deposition of ARTHUR W. KELLEY, PH.D. 13 Cleveland, Ohio 14 Friday, June 21, 2019 15 9:30 a.m. 16 17 18 19 20 Job No.: 244258 21 Pages: 1 - 309 22 Reported By: Cheryl L. Baker, RPR</p>	<p>1 APPEARANCES: 2 3 On Behalf of the Petitioner: 4 JAMES M. DOWD, ESQ. 5 WILMER HALE 6 350 South Grand Avenue 7 Suite 2100 8 Los Angeles, CA 90071 9 213.443.5309 10 213.443.5400 FAX 11 James.dowd@wilmerhale.com 12 13 RICHARD GOLDENBERG, ESQ. 14 WILMER HALE 15 60 State Street 16 Boston, MA 02109 17 617.526.6548 18 617.526.5000 FAX 19 Richard.goldenberg@wilmerhale.com 20 21 On Behalf of the Patent Owner: 22 JOSEPH M. SAUER, ESQ. DAVID E. ANDERSON, ESQ. JONES DAY North Point 901 Lakeside Avenue Cleveland, OH 44114 1.216.586.3939 1.216.579.0212 FAX jmsauer@jonesday.com danderson@jonesday.com</p>
<p>1 Deposition of ARTHUR W. KELLEY, PH.D., held at 2 the offices of: 3 JONES DAY 4 901 Lakeside Avenue 5 Cleveland, Ohio 44114 6 (216) 586-3939 7 8 Pursuant to notice, before Cheryl L. Baker, 9 Registered Professional Reporter, and Notary Public 10 in and for the State of Ohio. 11 12 - - - - - 13 14 15 16 17 18 19 20 21 22</p>	<p>1 EXAMINATION INDEX 2 3 EXAMINATION OF ARTHUR W. KELLEY, PH.D. 4 BY MR. DOWD 5 5 BY MR. SAUER 306 6 7 EXHIBIT INDEX 8 Exhibit 9 1026, 1126, 1227, 1328 Order Construing Claims 137 10 11 12 13 14 15 16 17 18 19 20 21 22</p>

5

1           ARTHUR W. KELLEY, Ph.D.  
2           Being first duly sworn or affirmed to  
3 testify to the truth, the whole truth and nothing  
4 but the truth, was examined and testified as  
5 follows:  
6           EXAMINATION BY COUNSEL FOR THE PETITIONER  
7 BY MR. DOWD:  
8           Q Welcome back, Dr. Kelley.  
9           A **Good morning.**  
10          Q Please state your full name for the  
11 record.  
12          A **Arthur Woodton, Kelley, K-e-l-l-e-y.**  
13          Q What's your current address?  
14          A **2033 Weston Green Loop, three words.**  
15          Q And you understand you're under oath  
16 today?  
17          A **Cary, North Carolina.**  
18          Q Sorry?  
19          A **Do you want the zip?**  
20          Q Sure.  
21          A **27513.**  
22          Q You understand you're under oath

6

1 today?  
2          A **I do.**  
3          Q And that means you must answer my  
4 questions truthfully and fully just as though you  
5 were in a court or a hearing room in front of a  
6 Judge.  
7          A **I understand.**  
8          Q Is there any reason why you can't  
9 provide complete and accurate testimony today?  
10          A **No reason.**  
11          Q Are you suffering from any medical  
12 condition?  
13          A **I'm not.**  
14          Q Under the influence of any  
15 medications?  
16          A **I'm not.**  
17          Q I know you've been deposed before, so  
18 you understand the ground rules. But I'll just  
19 briefly note them. If there's any question that I  
20 ask of you that you don't understand, please let me  
21 know so I can try to rephrase my question in the  
22 moment to avoid any confusion. Okay?

7

1           A **Okay.**  
2           Q You can take a break at any time. The  
3 only thing I'll ask is if we have a question  
4 pending, that you answer the question before we  
5 take a break. Okay?  
6           A **I understand.**  
7           Q Now, you understand that Intel has  
8 filed four IPR petitions seeking to invalidate  
9 Claims 1 through 20 of U.S. Patent No. 8,698,558?  
10          A **That's right.**  
11          Q If I refer to it as the '588 patent,  
12 that will make sense?  
13          A **That will be fine.**  
14          Q The IPR numbers are IPR208-1152 --  
15 sorry -- 2018-1152, 1153, 1154, and 1240. Is it  
16 okay if I refer to those as just by their last  
17 digits?  
18          A **That would be fine.**  
19          Q Now, you've submitted four  
20 declarations, one in each of the IPRs; is that  
21 right?  
22          A **That's correct.**

8

1           Q Let me just hand you copies of the  
2 depositions -- I'm sorry -- the declarations so  
3 that you have them handy. The first is in the 1152  
4 IPR, Exhibit 2005. Then in the 1153 IPR, again,  
5 Exhibit 2005; in the 1154 IPR, Exhibit 2002, and  
6 finally in the 1240 IPR, again, in Exhibit 2002.  
7          A **You know, as I sit here and look at**  
8 **this, these have binder clips on them. Could I**  
9 **have stapled copies? Could I perhaps have the**  
10 **stapled ones? That would avoid some of the**  
11 **problems.**  
12          Q No problem.  
13          A **That would be great. So let's**  
14 **inventory. 53, 4 -- I have the documents.**  
15          Q Thank you. And the documents that  
16 have been placed before you and previously marked,  
17 those are your four declarations in these IPRs; is  
18 that correct?  
19          A **That's correct.**  
20          Q Now, in each of your declarations,  
21 have you listed all of the documents that you  
22 considered in forming your opinions?

9

1     **A That's right.**  
2     Q And have you provided all the opinions  
3 that you have in each of the IPRs?  
4     **A That's right.**  
5     Q Great. And all bases for each  
6 opinion?  
7     **A That's right.**  
8     Q Do you have any plans to supplement  
9 your declarations?  
10    **A I have no plans to do so, but things**  
11 **happen. If I'm asked, I will. But as far as I**  
12 **know, there's no plan to do that.**  
13    Q Any plan to change any opinion stated  
14 in any declarations?  
15    **A No.**  
16    Q Now, you've provided opinions about  
17 the validity of the '588 patent in the related ITC  
18 case and the District Court case in San Diego; is  
19 that right?  
20    **A That's right.**  
21    Q Have your opinions changed since the  
22 ITC case?

10

1     **A No.**  
2     Q Has the basis for your opinion  
3 changed?  
4     **A No.**  
5     Q How about since the San Diego case?  
6     **A No.**  
7     Q Are you providing any theories of  
8 validity that were not presented in the ITC  
9 validity report?  
10    MR. SAUER: Objection; form.  
11    **A I would perhaps have to go back and**  
12 **review. But as I sit here today, I don't recall**  
13 **any differences. But I couldn't answer without a**  
14 **direct review.**  
15    Q Okay. And is your answer the same for  
16 the District Court case?  
17    **A That's right.**  
18    Q Now, before you were retained for the  
19 first case that involved '558, I think that was the  
20 ITC case?  
21    **A That's fine.**  
22    Q Had you heard of the '558 patent

11

1 before?  
2     **A No.**  
3     Q Had you heard of any of the inventors  
4 named on the '558 patent before that?  
5     **A I had not.**  
6     Q If you turn to the 1152 Declaration,  
7 but I think it's appended to each of them, turn to  
8 your CV at the back. In the 1152 Declaration,  
9 Appendix A.  
10    **A I have that.**  
11    Q And is your CV here accurate?  
12    **A Let me just review and make sure.**  
13    **A Yes. I think it is all the recent**  
14 **work that I've done is here. And the other things**  
15 **I know to be accurate.**  
16    Q If you turn to Page 3, you were a  
17 senior design engineer at Linear Technology  
18 Corporation from 2000 through September 2007?  
19    **A Page 3 of 9. And yes, that's what it**  
20 **says here on Linear Technology Corporation.**  
21    Q While working at Linear, did you work  
22 with power management circuits?

12

1     **A I did.**  
2     Q Were you involved in designing power  
3 management circuits at Linear Technologies?  
4     **A I was.**  
5     Q Now, am I correct that power  
6 management circuits manage power?  
7     **A That's kind of a tautology. But**  
8 **certainly power management, integrated circuits get**  
9 **used in power supplies.**  
10    Q Is it fair to say that one goal of a  
11 management circuit is to make sure that the circuit  
12 that's being managed has enough power to operate?  
13    **A When you say, "the circuit that's**  
14 **being managed," I'm not quite sure of that.**  
15 **There's input power. There's output power.**  
16 **There's a supply in between.**  
17    Q Sure. So I'm thinking here of the  
18 power management circuit will manage the power  
19 that's supplied to some load. Is that fair?  
20    **A That's fair.**  
21    Q And one goal of the power management  
22 circuit is to make sure the power supplied to that

13

1 load is sufficient to operate. Right?

2 **A The load will have certain**

3 **specifications. And then the power management**

4 **circuit of the power supply is intended to stay**

5 **within that specification. That's correct.**

6 Q Okay. And then another goal is to

7 make sure that you don't waste power unnecessarily.

8 Is that fair?

9 **A High efficiency would be typically the**

10 **way we would say that. But yes, we would like them**

11 **as highly efficient as possible.**

12 Q And so in designing a power management

13 circuit, you're balancing those competing concerns,

14 providing enough power for the load while at the

15 same time being as efficient as you can be. Is

16 that fair?

17 **A I'm not sure I'd characterize them as**

18 **being competing. There's certainly simultaneous**

19 **concerns. You worry about both of those in terms**

20 **of making your power supply work properly.**

21 Q Okay. But those are kind of standard

22 objectives of a designer designing a power

14

1 management circuit?

2 **A At least.**

3 Q Okay. Let me provide you a copy of

4 the patent. So this has previously been marked in

5 the 1152 IPR as Intel 1001. I'll give you the

6 version that's stapled.

7 **A Thank you.**

8 Q And Exhibit 1001, that's the '558

9 patent?

10 **A That's right.**

11 Q If you -- withdrawn.

12 Am I correct that the '558 patent is not the

13 first to invent envelope tracking?

14 MR. SAUER: Objection; form.

15 **A Well, certainly the '558 patent**

16 **describes a way of doing envelope tracking. Could**

17 **the words "envelope tracking" be applied to**

18 **something that came before the '558 patent? I'd**

19 **imagine they could be, but we'd have to look at**

20 **specifics to really answer that question**

21 **definitively.**

22 Q But you've seen some prior art

15

1 references in this case?

2 **A I have.**

3 Q Prior art references that perform

4 envelope tracking, right?

5 **A Prior art references describe**

6 **themselves as envelope tracking.**

7 Q If you would turn to Figure 2 in the

8 patent. There's 2A through 2C.

9 **A Okay.**

10 Q Let me focus you on 2C for a moment.

11 **A Okay.**

12 Q Now, that is -- that shows an envelope

13 tracker, right?

14 **A That shows a block 230, which is an**

15 **envelope tracker, yes.**

16 Q And then on the right-hand side of 2C,

17 that shows kind of a graph that shows the actual

18 envelope tracking function, right?

19 **A Well, it's an illustrative figure that**

20 **shows how that particular implementation would**

21 **work. Sure.**

22 Q Now, the envelope tracker, as shown in

16

1 Figure 2C, that approach was known in the prior

2 art, right?

3 **A I believe that it was in some**

4 **implementations.**

5 Q Okay. Now, if you look at Figures 2A

6 through 2C, what's shown on the right for each of

7 these figures illustrates power savings that is

8 provided -- let me break that down.

9 So along the top, there's a constant power

10 source, Vbat, in 2A. Do you see that?

11 **A That I see.**

12 Q And in Figure 2B, it shows some power

13 savings by using the average power tracking

14 approach. Is that fair?

15 **A Well, actually, I mean -- I think the**

16 **descriptive text relating to these figures talks**

17 **about that. I'm not sure if it's labeled as such**

18 **on these figures. But it's certainly meant to be**

19 **an illustration of some text that would talk about**

20 **how to save power; example, using average power**

21 **tracking.**

22 Q And then if we step down from Figure

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