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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 1330  
IPR2018-01240

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

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<p style="text-align: right;">13</p> <p>1 load is sufficient to operate. Right?</p> <p>2 <b>A The load will have certain</b></p> <p>3 <b>specifications. And then the power management</b></p> <p>4 <b>circuit of the power supply is intended to stay</b></p> <p>5 <b>within that specification. That's correct.</b></p> <p>6 Q Okay. And then another goal is to</p> <p>7 make sure that you don't waste power unnecessarily.</p> <p>8 Is that fair?</p> <p>9 <b>A High efficiency would be typically the</b></p> <p>10 <b>way we would say that. But yes, we would like them</b></p> <p>11 <b>as highly efficient as possible.</b></p> <p>12 Q And so in designing a power management</p> <p>13 circuit, you're balancing those competing concerns,</p> <p>14 providing enough power for the load while at the</p> <p>15 same time being as efficient as you can be. Is</p> <p>16 that fair?</p> <p>17 <b>A I'm not sure I'd characterize them as</b></p> <p>18 <b>being competing. There's certainly simultaneous</b></p> <p>19 <b>concerns. You worry about both of those in terms</b></p> <p>20 <b>of making your power supply work properly.</b></p> <p>21 Q Okay. But those are kind of standard</p> <p>22 objectives of a designer designing a power</p>	<p style="text-align: right;">15</p> <p>1 references in this case?</p> <p>2 <b>A I have.</b></p> <p>3 Q Prior art references that perform</p> <p>4 envelope tracking, right?</p> <p>5 <b>A Prior art references describe</b></p> <p>6 <b>themselves as envelope tracking.</b></p> <p>7 Q If you would turn to Figure 2 in the</p> <p>8 patent. There's 2A through 2C.</p> <p>9 <b>A Okay.</b></p> <p>10 Q Let me focus you on 2C for a moment.</p> <p>11 <b>A Okay.</b></p> <p>12 Q Now, that is -- that shows an envelope</p> <p>13 tracker, right?</p> <p>14 <b>A That shows a block 230, which is an</b></p> <p>15 <b>envelope tracker, yes.</b></p> <p>16 Q And then on the right-hand side of 2C,</p> <p>17 that shows kind of a graph that shows the actual</p> <p>18 envelope tracking function, right?</p> <p>19 <b>A Well, it's an illustrative figure that</b></p> <p>20 <b>shows how that particular implementation would</b></p> <p>21 <b>work. Sure.</b></p> <p>22 Q Now, the envelope tracker, as shown in</p>
<p style="text-align: right;">14</p> <p>1 management circuit?</p> <p>2 <b>A At least.</b></p> <p>3 Q Okay. Let me provide you a copy of</p> <p>4 the patent. So this has previously been marked in</p> <p>5 the 1152 IPR as Intel 1001. I'll give you the</p> <p>6 version that's stapled.</p> <p>7 <b>A Thank you.</b></p> <p>8 Q And Exhibit 1001, that's the '558</p> <p>9 patent?</p> <p>10 <b>A That's right.</b></p> <p>11 Q If you -- withdrawn.</p> <p>12 Am I correct that the '558 patent is not the</p> <p>13 first to invent envelope tracking?</p> <p>14 MR. SAUER: Objection; form.</p> <p>15 <b>A Well, certainly the '558 patent</b></p> <p>16 <b>describes a way of doing envelope tracking. Could</b></p> <p>17 <b>the words "envelope tracking" be applied to</b></p> <p>18 <b>something that came before the '558 patent? I'd</b></p> <p>19 <b>imagine they could be, but we'd have to look at</b></p> <p>20 <b>specifics to really answer that question</b></p> <p>21 <b>definitively.</b></p> <p>22 Q But you've seen some prior art</p>	<p style="text-align: right;">16</p> <p>1 Figure 2C, that approach was known in the prior</p> <p>2 art, right?</p> <p>3 <b>A I believe that it was in some</b></p> <p>4 <b>implementations.</b></p> <p>5 Q Okay. Now, if you look at Figures 2A</p> <p>6 through 2C, what's shown on the right for each of</p> <p>7 these figures illustrates power savings that is</p> <p>8 provided -- let me break that down.</p> <p>9 So along the top, there's a constant power</p> <p>10 source, Vbat, in 2A. Do you see that?</p> <p>11 <b>A That I see.</b></p> <p>12 Q And in Figure 2B, it shows some power</p> <p>13 savings by using the average power tracking</p> <p>14 approach. Is that fair?</p> <p>15 <b>A Well, actually, I mean -- I think the</b></p> <p>16 <b>descriptive text relating to these figures talks</b></p> <p>17 <b>about that. I'm not sure if it's labeled as such</b></p> <p>18 <b>on these figures. But it's certainly meant to be</b></p> <p>19 <b>an illustration of some text that would talk about</b></p> <p>20 <b>how to save power; example, using average power</b></p> <p>21 <b>tracking.</b></p> <p>22 Q And then if we step down from Figure</p>

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