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Page 418

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

---oOo---

TQ DELTA, LLC,

Plaintiff,

vs.

C.A. No. 13-CV-1835-RGA

2WIRE, INC.,

Defendants.

_____/

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DEPOSITION OF KRISTA S. JACOBSEN, Ph.D.

VOLUME III, PAGES 418 - 591

SAN FRANCISCO, CALIFORNIA

WEDNESDAY, FEBRUARY 6, 2019

BY: ANDREA M. IGNACIO, CSR, RPR, CRR, CCRR, CLR ~

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<p>1 IN THE UNITED STATES DISTRICT COURT</p> <p>2 FOR THE DISTRICT OF DELAWARE</p> <p>3 ---oOo---</p> <p>4</p> <p>5 TQ DELTA, LLC,</p> <p>6 Plaintiff,</p> <p>7 vs. C.A. No. 13-CV-1835-RGA</p> <p>8 2WIRE, INC.,</p> <p>9 Defendants.</p> <p>10 _____/</p> <p>11</p> <p>12 Deposition of Krista S. Jacobsen, Ph.D.,</p> <p>13 taken on behalf of the Plaintiff, on Wednesday,</p> <p>14 February 6, 2019, at Goodwin Procter LLP,</p> <p>15 601 Marshall Street, Redwood City, California,</p> <p>16 beginning at 9:11 a.m., and ending at 3:28 p.m.,</p> <p>17 Pursuant to Notice, and before me,</p> <p>18 ANDREA M. IGNACIO, CSR, RPR, CRR, CLR ~ No. 9830.</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 INDEX</p> <p>2</p> <p>3 WITNESS: Krista S. Jacobsen, Ph.D. - Volume III</p> <p>4</p> <p>5 EXAMINATION PAGE</p> <p>6 By Mr. McAndrews 424</p> <p>7</p> <p>8 EXHIBITS</p> <p>9 EXHIBIT PAGE</p> <p>10 Exhibit 23 Opening Report on Invalidity of 424</p> <p>11 Dr. Krista S. Jacobsen for</p> <p>12 Family 3 patents</p> <p>13 Exhibit 24 Reply Expert Report of Dr. Krista 465</p> <p>14 S. Jacobsen for Family 3 Patents</p> <p>15 Exhibit 25 Rebuttal Expert Report on 465</p> <p>16 Non-Infringement of Dr. Krista S.</p> <p>17 Jacobsen for Family 3 Patents</p> <p>18 Exhibit 26 U.S. Patent 5,764,649 Tong 466</p> <p>19 Exhibit 27 Fundamentals of DSL Technology 466</p> <p>20 Exhibit 28 U.S. Patent 7,269,208 Mazzoni, 480</p> <p>21 Bates 2WIRE00028340 - '353</p> <p>22 Exhibit 29 ITU-Telecommunication 501</p> <p>23 Standardization Sector - VDSL2</p> <p>24 - Constraining the Interleaver</p> <p>25 Complexity, Bates 2WIRE00030957 - '963</p>
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<p>1 APPEARANCES:</p> <p>2</p> <p>3</p> <p>4</p> <p>5 FOR THE PLAINTIFF TQ DELTA, LLC:</p> <p>6 MCANDREWS HELD & MALLOY LTD</p> <p>7 By: PETER MCANDREWS, Esq.</p> <p>8 RAJENDRA A. CHIPLUNKAR, Esq.</p> <p>9 500 West Madison Street, 34th Floor</p> <p>10 Chicago, Illinois 60661</p> <p>11 Phone: 312.775.8000</p> <p>12 pwmcandrews@mcandrews-ip.com</p> <p>13</p> <p>14</p> <p>15 FOR THE DEFENDANT 2WIRE, INC.:</p> <p>16 GOODWIN PROCTER LLP</p> <p>17 By: RACHEL WALSH, Esq.</p> <p>18 Three Montgomery Center</p> <p>19 San Francisco, California 94111</p> <p>20 Phone: 415.733.6021</p> <p>21 rwalsh@goodwinlaw.com</p> <p>22</p> <p>23 THE VIDEOGRAPHER: Keigo Painter</p> <p>24</p> <p>25</p>	<p>1 EXHIBITS (Cont.)</p> <p>2</p> <p>3 EXHIBIT PAGE</p> <p>4 Exhibit 30 ITU-T G.993.1 Series G: 550</p> <p>5 Transmission Systems and Media,</p> <p>6 Digital Systems and Networks, Very</p> <p>7 high speed digital subscriber</p> <p>8 line transceivers, Bates</p> <p>9 2WIRE00030729 - '956</p> <p>10 Exhibit 31 ITU-T G.992.2 Series G: 551</p> <p>11 Transmission Systems and Media,</p> <p>12 Digital Systems and Networks,</p> <p>13 Splitterless asymmetric digital</p> <p>14 subscriber line (ADSL)</p> <p>15 Transceivers, Bates 2WIRE00052246</p> <p>16 - '424</p> <p>17 Exhibit 32 U.S. Patent 5,751,741, Bates 551</p> <p>18 2WIRE00028366 - '378</p> <p>19 Exhibit 33 U.S. Patent 6,707,822 551</p> <p>20 Fadavi-Ardekani et al, Bates</p> <p>21 2WIRE00052176 - '184</p> <p>22</p> <p>23 ---oOo---</p> <p>24</p> <p>25</p>

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HIGHLY CONFIDENTIAL ATTORNEYS' EYES ONLY

Page 423	<p>1 REDWOOD CITY, CALIFORNIA</p> <p>2 WEDNESDAY, FEBRUARY 6, 2019</p> <p>3 9:11 A.M.</p> <p>4</p> <p>5</p> <p>6</p> <p>7 THE VIDEOGRAPHER: Here begins the videotaped</p> <p>8 deposition of Dr. Krista Jacobsen. Tape 1,</p> <p>9 Volume III.</p> <p>10 In the matter of TQ Delta versus 2Wire. Case</p> <p>11 No. 13-CV-1835 RGK.</p> <p>12 Today's date is February 6, 2019, and the</p> <p>13 time on the video monitor is 9:11.</p> <p>14 My name is Keigo Painter, and the court</p> <p>15 reporter is Andrea Ignacio, of Thompson Court</p> <p>16 Reporters.</p> <p>17 Today's deposition is taking place at Goodwin</p> <p>18 Procter in Redwood City, California.</p> <p>19 Will counsel please introduce themselves and</p> <p>20 state whom they represent, beginning with the noticing</p> <p>21 party.</p> <p>22 MR. MCANDREWS: Peter McAndrews from</p> <p>23 McAndrews, Held & Malloy, on behalf of TQ Delta.</p> <p>24 MR. CHIPLUNKAR: Rajendra Chiplunkar from</p> <p>25 McAndrews, Held & Malloy, on behalf of TQ Delta.</p>	Page 425	<p>1 A That's right.</p> <p>2 Q So you're -- you understand the process?</p> <p>3 A I do.</p> <p>4 Q You seem to be doing very well with the idea</p> <p>5 that we give oral responses; right?</p> <p>6 A Understood, yes.</p> <p>7 Q Help the court reporter out like that.</p> <p>8 Are you represented by counsel today?</p> <p>9 A Yes. I have Ms. Walsh.</p> <p>10 Q Okay. Can you tell me how you prepared for</p> <p>11 your deposition today?</p> <p>12 A I reviewed my reports. I reviewed the prior</p> <p>13 art. I met with Mr. Schuman and Ms. Walsh on Monday.</p> <p>14 Q Did you -- so you said you met with them on</p> <p>15 Monday. You've had -- you had a deposition taken for</p> <p>16 the Family 2 patents yesterday; right?</p> <p>17 A Correct.</p> <p>18 Q And today is related to Family 3.</p> <p>19 Is that your understanding?</p> <p>20 A That's my understanding.</p> <p>21 Q Okay. So let me try to separate out the</p> <p>22 Family 3 preparation.</p> <p>23 So did you have a single meeting for Family 3</p> <p>24 to prepare for the deposition?</p> <p>25 A We had one meeting that covered both Family 2</p>
Page 424	<p>1 MS. WALSH: Rachel Walsh from Goodwin</p> <p>2 Procter, on behalf of defendant 2Wire.</p> <p>3 THE VIDEOGRAPHER: Will the court reporter</p> <p>4 please swear in the witness.</p> <p>5</p> <p>6 KRISTA JACOBSEN, Ph.D.,</p> <p>7 having been sworn as a witness</p> <p>8 by the Certified Shorthand Reporter,</p> <p>9 testified as follows:</p> <p>10</p> <p>11 THE VIDEOGRAPHER: You may proceed.</p> <p>12</p> <p>13 (Document marked Exhibit 22</p> <p>14 for identification.)</p> <p>15</p> <p>16 EXAMINATION</p> <p>17 BY MR. MCANDREWS:</p> <p>18 Q Good morning, Dr. Jacobsen.</p> <p>19 A Good morning.</p> <p>20 Q Please state your full name for the record.</p> <p>21 A Krista Susan Jacobsen.</p> <p>22 Q And your current home address?</p> <p>23 A 114 George Court, Campbell, California 95008.</p> <p>24 Q Okay. You have had your deposition taken in</p> <p>25 this case twice now; right?</p>	Page 426	<p>1 and Family 3.</p> <p>2 Q And that all occurred on Monday?</p> <p>3 A That's right.</p> <p>4 Q And how long was the meeting?</p> <p>5 A We started at 9:30, took an hour-ish for</p> <p>6 lunch, and then I think we finished around 4:00.</p> <p>7 Q Okay. Did anyone else participate in that</p> <p>8 meeting?</p> <p>9 A No.</p> <p>10 Q Any -- so no one else in person; right?</p> <p>11 A No one else in person.</p> <p>12 Q Anyone else on the phone?</p> <p>13 A No.</p> <p>14 Q Okay. Did you do any additional preparation</p> <p>15 yesterday after the Family 2 deposition ended?</p> <p>16 A I reviewed documents myself.</p> <p>17 Q Did you meet with counsel about the subject</p> <p>18 matter of the Family 3 deposition?</p> <p>19 A No.</p> <p>20 Q Did you speak to anyone on the phone about</p> <p>21 Family 3?</p> <p>22 A No.</p> <p>23 Q What documents did you review last night?</p> <p>24 A I looked at the prior art, and I looked at my</p> <p>25 own report -- reports, and I think I looked at the</p>

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Page 427	<p>1 VDSL2 standard.</p> <p>2 Q Okay. Now, let me go back a little bit</p> <p>3 further.</p> <p>4 So in preparing your expert reports for</p> <p>5 Family 3, did you consult with anybody?</p> <p>6 A Not other than counsel.</p> <p>7 Q So for Family 3, you did not speak to Mr. Ben</p> <p>8 Miller from 2Wire?</p> <p>9 A For Family 3, I don't think so.</p> <p>10 Q Okay. Did you speak with any other -- anyone</p> <p>11 else at 2Wire?</p> <p>12 A No.</p> <p>13 Q Okay. So you spoke only with counsel in</p> <p>14 preparing your Family 3 reports?</p> <p>15 A Yes.</p> <p>16 Q And was that counsel from Goodwin Procter?</p> <p>17 A Yes.</p> <p>18 Q Was it anyone other than Ms. Walsh and</p> <p>19 Mr. Schuman?</p> <p>20 A Yes. Mr. Cooper.</p> <p>21 Q What's Mr. Cooper's name?</p> <p>22 A Monte.</p> <p>23 Q Full name?</p> <p>24 A Monte Cooper.</p> <p>25 Q Okay. Did you meet with anyone in person</p>	Page 429	<p>1 during the course of the preparation of any of your</p> <p>2 reports?</p> <p>3 A No.</p> <p>4 Q Have you conferred with any other experts in</p> <p>5 the field of chip design?</p> <p>6 A No.</p> <p>7 Q And -- and we're going to take a look at your</p> <p>8 reports here in a minute so you can refresh your</p> <p>9 memory.</p> <p>10 But just generally, do you know if there are</p> <p>11 any materials, that you considered in preparing your</p> <p>12 reports, that are not listed in your reports?</p> <p>13 A I don't think so. I -- there's a long list</p> <p>14 of materials at the back of my opening report, I</p> <p>15 believe, where I -- I believe I listed everything I've</p> <p>16 considered throughout the course of this entire case</p> <p>17 in -- in assessing all of the families. And I believe</p> <p>18 that list is comprehensive.</p> <p>19 Q Okay. Just for a little bit of baseline</p> <p>20 terminology, I've -- I've referenced Family 3.</p> <p>21 When I say "the Family 3 patents," do you</p> <p>22 understand that, for purposes of this case, to include</p> <p>23 U.S. Patent No. 7,836,381, Patent No. 7,844,882,</p> <p>24 Patent No. 8,276,048, and Patent No. 8,495,473?</p> <p>25 A Yes.</p>
Page 428	<p>1 during the preparation of your Family 3 reports?</p> <p>2 A I don't think so. I think it was all on the</p> <p>3 phone.</p> <p>4 Q Did you speak with -- so beyond Goodwin</p> <p>5 Procter counsel and -- did you speak with anyone else</p> <p>6 about your Family 3 reports, or the subject matter of</p> <p>7 the reports?</p> <p>8 A I spoke with Mr. Eichmann at one point.</p> <p>9 Q And this is the conversation that we</p> <p>10 discussed briefly yesterday, where you had a</p> <p>11 discussion with Mr. Eichmann about the prior art --</p> <p>12 I'm sorry -- about the prosecution history of the</p> <p>13 Family 3 patents?</p> <p>14 A That's right.</p> <p>15 Q Do you recall when that occurred?</p> <p>16 A I don't -- I don't remember. Last year at</p> <p>17 some point, but I -- I don't know if it was November</p> <p>18 or December.</p> <p>19 Q Okay. Did you provide -- as you've done with</p> <p>20 the prior families, Family 1 and Family 2, did you</p> <p>21 provide to Mr. Eichmann any kind of ranking of the</p> <p>22 Family 3 patents?</p> <p>23 A I don't believe so. I don't believe I was</p> <p>24 asked to do that.</p> <p>25 Q Okay. Did you confer with anyone at Broadcom</p>	Page 430	<p>1 Q And if I refer to an individual patent by its</p> <p>2 last three numbers, you would understand that I'm</p> <p>3 referring to one of those four patents?</p> <p>4 A Yes, I would.</p> <p>5 Q Okay. And let me do this one now.</p> <p>6 So you understand that there's a number of</p> <p>7 2Wire products at issue in the case?</p> <p>8 A I do.</p> <p>9 Q And do you understand that those products for</p> <p>10 Family 3, that have been accused of infringement and</p> <p>11 are still at issue currently, are the 2Wire model Nos.</p> <p>12 5031NV?</p> <p>13 Do you understand that one is involved?</p> <p>14 A I do.</p>

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<p>17 Q And if you have any distinction you'd like to</p> <p>18 make amongst those, please let me know. I'll try to</p> <p>19 separate them out, where I have an idea that there may</p> <p>20 be some distinction, but please do that.</p> <p>21 A I will. Thank you.</p> <p>22 Q Okay. So just as we -- we've -- we spent</p> <p>23 some time on your background in some earlier</p> <p>24 depositions, so I'm not going to rehash that.</p> <p>25 But a little more specifically, I'd like to</p>	<p>1 referring to those as -- as bytes.</p> <p>2 If there's a distinction you want to make</p> <p>3 when we're looking at a particular reference, please</p> <p>4 call that out.</p> <p>5 A Okay.</p> <p>6 Q Okay. So from a functionality level, you</p> <p>7 understand the inputs and the outputs of the</p> <p>8 interleaver operation; is that right?</p> <p>9 A Yes.</p> <p>10 Q And you understand the algorithms by which</p> <p>11 bytes can be spread; correct?</p> <p>12 A Yes, yes.</p> <p>13 Q Okay. So -- but when you said that you had</p> <p>14 not been involved in designing an interleaver or</p> <p>15 de-interleaver, are you -- are you referring more</p> <p>16 to -- so first of all, the -- the physical hardware</p> <p>17 that's used for that?</p> <p>18 A Right.</p> <p>19 There are different ways to implement an</p> <p>20 interleaver or de-interleaver, hardware or software.</p> <p>21 I'm not a chip designer, so I have not designed</p> <p>22 hardware to perform interleaving or de-interleaving.</p> <p>23 Q And have you specifically written any</p> <p>24 algorithm that will cause interleaving or</p> <p>25 de-interleaving to occur?</p>
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<p>1 understand your background in designing any aspects of</p> <p>2 an interleaver or de-interleaver.</p> <p>3 Can you tell me, do you have any experience</p> <p>4 in that area?</p> <p>5 A I have not personally designed an interleaver</p> <p>6 or de-interleaver. It is the type of functionality</p> <p>7 that systems engineers know and understand. So I have</p> <p>8 that system level understanding of it.</p> <p>9 Q So you have a -- you have a -- so what you're</p> <p>10 saying is, you have a -- you have a functionality</p> <p>11 understanding, in the sense that you understand the</p> <p>12 way in which an interleaver can manipulate bytes or --</p> <p>13 I guess more generically, I've seen in your books</p> <p>14 referred to as symbols?</p> <p>15 A Correct.</p> <p>16 Q Today, if we refer to them as -- so isn't it</p> <p>17 generally true that, in the DSL art, it's manipulating</p> <p>18 the order or spacing of -- of bytes?</p> <p>19 A Yes --</p> <p>20 Q Okay.</p> <p>21 A -- in the DSL space.</p> <p>22 Q Okay. So I think, in some of these</p> <p>23 references, more generically, sometimes that's</p> <p>24 referred to symbol as the unit that is being shuffled</p> <p>25 or spread out. But today, I'm generally going to be</p>	<p>1 A Possibly in the context of simulations of</p> <p>2 our -- of systems. I don't remember offhand.</p> <p>3 Q Do you remember what type of interleaver you</p> <p>4 were simulating, if you -- if that's actually what you</p> <p>5 did?</p> <p>6 A I don't remember. Given that the context</p> <p>7 would have been DSL, it likely would have been a</p> <p>8 convolutional interleaver.</p> <p>9 Q Okay. So -- so to the extent that you have</p> <p>10 had any experience simulating an interleaver, you</p> <p>11 would have been simulating a convolutional</p> <p>12 interleaver?</p> <p>13 A Most likely.</p> <p>14 Q Okay. And that's because generally, the --</p> <p>15 the interleaver operation for DSL is convolutional</p> <p>16 interleaving?</p> <p>17 A Typically, yes.</p> <p>18 Q Okay. You're -- you're aware that in -- so</p> <p>19 is it true that, in the DSL standards that are -- or</p> <p>20 the DSL standard, I guess, that is relevant to the</p> <p>21 infringement side of the case, at least, VDSL2, that</p> <p>22 VDSL2 only uses convolutional interleaving?</p> <p>23 A That's right.</p> <p>24 Q Okay. And is it also true that -- so we're</p> <p>25 going to be referencing some prior art today. And to</p>

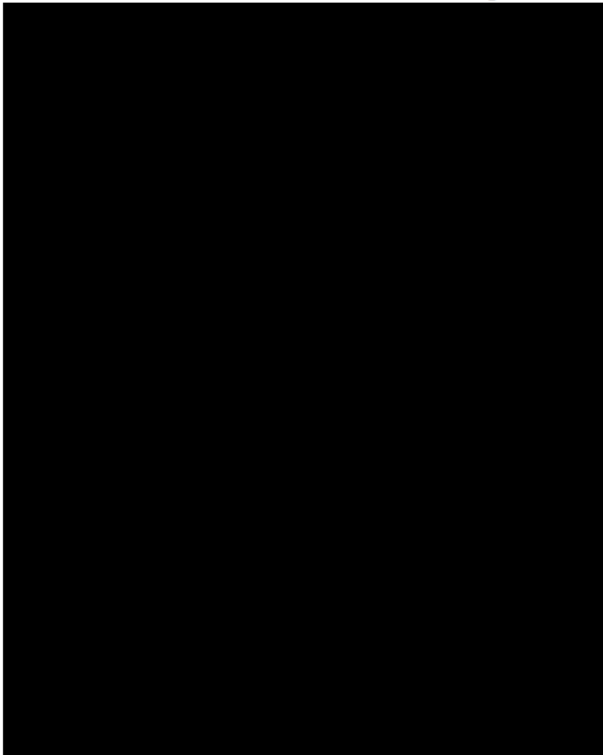
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1 the extent that that prior art is intended to be for
2 ADSL or ADSL2, that would also be only convolutional
3 interleaving?
4 A That's correct.
5 Q Okay. And there may be -- I -- I can't
6 recall right now. There may be some prior art
7 references that are in the context of T1.413, which is
8 a predecessor to the ITU DSL standards; is that right?
9 A That's right.
10 Q Okay. And T1.413 Issue 1 and Issue 2 both
11 only use convolutional interleaving; is that right?
12 A That's correct.
13 Q Okay. So when you -- to the extent -- and I
14 know that you're trying to remember if you actually
15 did this.
16 But did your simulation work involve
17 determining how much memory or the layout of any
18 memory that would be required to implement what you
19 were simulating?
20 A I don't remember. I don't think so, but I
21 don't remember.
22 Q Okay. So you have worked in the past with at
23 least one company, maybe overlapping. So -- so you
24 worked with TI; right?
25 A Correct.

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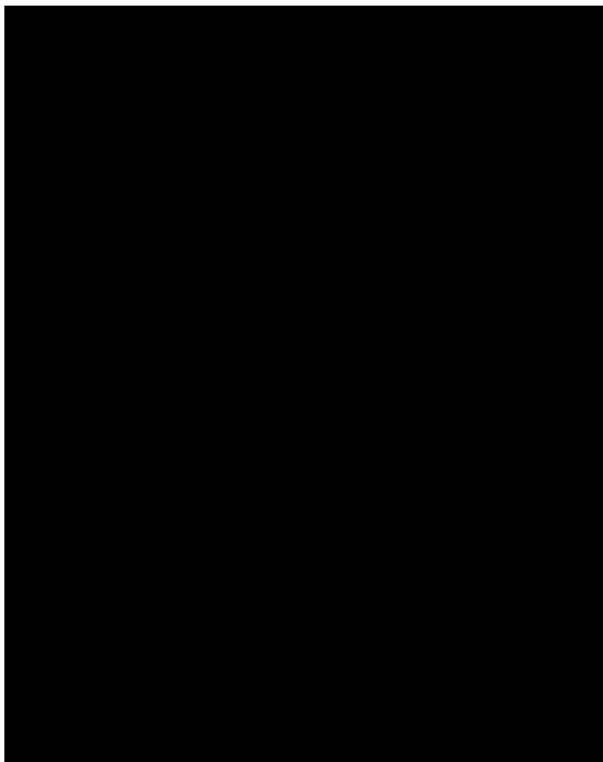


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1 Q And TI was in the business of designing and
2 producing DSL chipsets; correct?
3 A That's right.



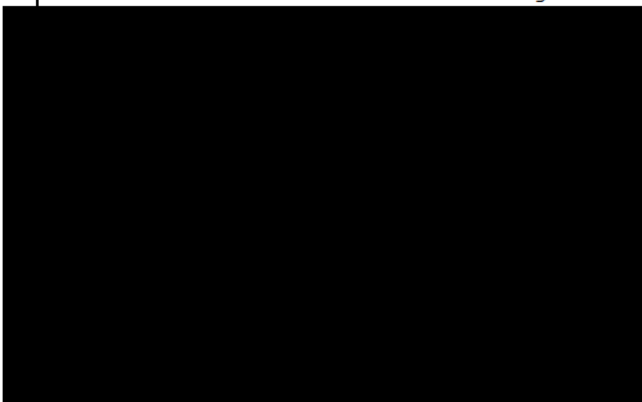
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14 So what time frame -- during what time frame
15 did you participate in ITU-related DSL standards
16 development?

17 A ITU specifically?

18 Q Correct.

19 A Starting in early 2000 -- I believe it was
20 early 2000 -- and through the summer of 2006.

21 Q Okay. And then, before 2000, did you also
22 participate in the T1.413 DSL-related standards
23 bodies?

24 A I did. T1/E1.4, and also ETSI TM6.

25 Q And the -- the DSL-related standards that

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1 resulted from the T1/E1.4 work were the two T1.413
2 standards?

3 A One of them -- I was not involved in Issue 1.
4 That was complete before I began working in T1/E1.4.
5 So it would have been T1.413 Issue 2. And then there
6 were other assorted DSL-related standards, such as
7 spectrum management. I think it was T1.417. There
8 was a VDSL standard being developed, and I was working
9 on that as well.

10 Q Did that ever result in an approved standard,
11 the VDSL work for T1/E1?

12 A They published -- oh, man -- they published
13 something, and I don't remember if it was just a
14 system requirements document, or if it had more of the
15 details of the transceiver itself. I can't remember.

16 Q So during your time with T1/E1 and with the
17 ITU DSL-related standards development, did you
18 personally contribute any concepts for interleaving or
19 de-interleaving?

20 A Not other than what potential values of
21 interleave depth and FEC code word size, that -- that
22 level.

23 Q Can you be more specific to that?

24 Was there something about -- what particular
25 aspect of that?

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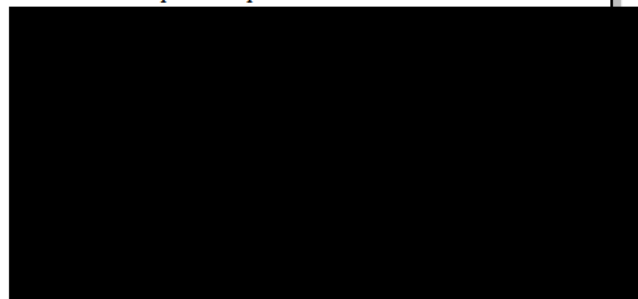
1 A Talking about, for example, impulse noise
2 immunity, and how to best create a system that would
3 be able to withstand particular durations of impulse
4 noise.

5 And as you know, the interleaver spreads the
6 code word out over time, and its impulse noise
7 immunity is dependent on how much spread out it is.

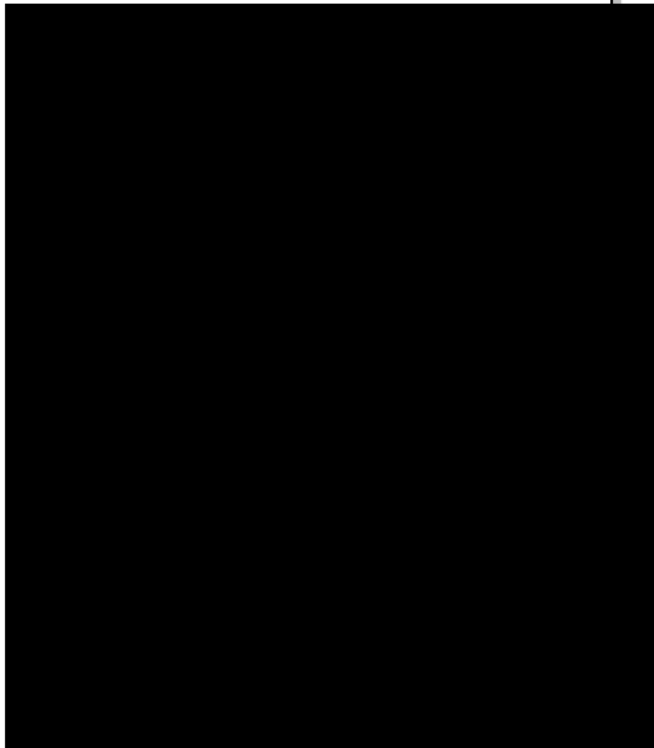
8 Q And so, are you talking about something as
9 simple as, We need an interleaver depth of X?

10 Or was it something maybe a little bit more
11 specific, like, We want -- we want a code word size of
12 X with Y number of parity bytes?

13 We want an interleaver block size of Y, and
14 we want a depth of Z, and that's going to optimize
15 some aspect of impulse noise?



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8 (Pages 443 to 446)

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3 So -- so if a document was -- was called
4 "993.1 Foundation" or "Foundations," what would --
5 what would that mean to you?

6 A That is my understanding of the
7 characterization of the first VDSL document published
8 by the ITU.

9 Q Okay. And -- and you would characterize that
10 as essentially a draft 993.1 standard?

11 A I would characterize it as a -- an early
12 version, potentially not a complete standard,
13 specifying everything that would normally be specified
14 in a full standard.

15 Q Are you familiar with anyone having attempted
16 to commercialize a product based on that Foundations
17 document?

18 A I'm not aware of anyone.

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10 (Pages 451 to 454)

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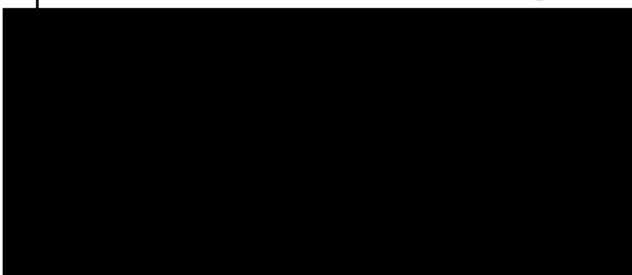
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11 (Pages 455 to 458)

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10 Q Okay. And so your discussion of, for
11 example, Tong's implementation, was simply to
12 illustrate that there may be additional amounts of
13 memory -- there may be -- theoretically, there may be
14 additional amounts of memory beyond
15 I minus 1/D minus 1 over 2 that are used; correct?
16 A Well, that discussion, I believe, proves
17 conclusively that there -- that there is always more
18 than I minus 1 times D minus 1 over 2, because you
19 have to somewhere save the -- the addresses -- the
20 read and write addresses.
21 So the amount of memory used is always a
22 little bit more than that, even in a very efficient
23 implementation.
24 Q So let's talk about that.
25 So the -- the memory addresses that you're

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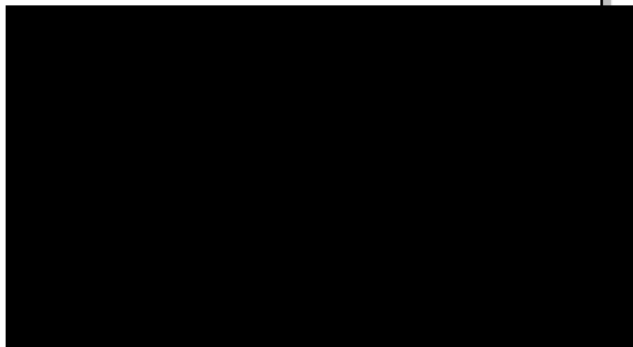
1 pointers that are stored, and each require a byte of
2 memory to store the pointers; right?
3 A At least a byte, yes.
4 Q Okay. And I think, in Tong's implementation,
5 they're a single byte, but we can look at that. You
6 can correct that.
7 So let's, just for argument's sake, say that
8 there are three bytes with three pointers stored;
9 right?
10 A Okay.
11 Q Okay. And do you have an understanding of
12 how many versions of those three pointers would have
13 to be stored in the memory?
14 A I would have to look at it.
15 Q Okay. So we can go there, but let me -- let
16 me cover something that -- so we can go over what is
17 the amount.
18 So what I'm going to try to get to is, what
19 is the amount that's necessary to store those?
20 And we can do that when we look at the
21 specific details. But I want to ask a more general
22 question.
23 Is it your position that those memory
24 pointers necessarily must be stored in the
25 interleave/de-interleave memory?

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1 talking about, you're talking about in -- in Tong's
2 implementation, he stores what -- and you can tell me
3 if I'm wrong about this, but Tong's implementation
4 will store essentially three parameters times the
5 block length; correct?
6 A I'm not sure what you mean by "times the
7 block length."
8 Q So there are -- there are three parameters,
9 and you're talking about three memory addresses;
10 right?
11 A Right.
12 Q And when I say "memory addresses," let's --
13 let me be a little more specific.
14 So there will be three memory locations that
15 will store something; right?
16 A I would have to review it. I mean, off the
17 top of my head, I don't remember that.
18 Q Okay. We can pull that out.
19 But I'm -- so -- so is it -- and we can go to
20 the document if -- but I -- I'm feeling you're going
21 to have an understanding at this level, so let me just
22 try it.
23 So those -- those are memory pointers?
24 A That's right.
25 Q Okay. So -- so there are three memory

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1 A It's not necessary that they're stored there,
2 but they need to be stored somewhere.
3 Q Okay. So if -- if you've got a -- a block of
4 shared interleaver/de-interleaver memory, and the
5 design detail was that those memory addresses are not
6 stored there, then those -- those memory pointers
7 would not be using any portion of the
8 interleaver/de-interleaver memory; right?
9 A It would depend on the implementation.
10 Q Right.
11 So -- so the answer is, it's true that those
12 are not necessarily stored in the
13 interleaver/de-interleaver memory?



12 (Pages 459 to 462)

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1 correct?

2 **A That's right. They're addresses.**3 Q And -- and so they don't store information
4 that is being de-interleaved; correct?5 **A Correct.**

6 MR. MCANDREWS: Okay. Take a short break.

7 THE VIDEOGRAPHER: Going off the record. The
8 time is now 10:10.

9 (Recess taken.)

10 THE VIDEOGRAPHER: Going on the record. The
11 time is now 10:26.12 (Documents marked Exhibits 23 - 25
13 for identification.)

14 MR. MCANDREWS: Okay.

15 Q I'm going to hand you -- I should have done
16 this earlier. But let me hand you three exhibits that
17 have been marked Exhibit 23, 24, and 25.

18 Exhibit 23 is entitled:

19 "Opening Expert Report on Invalidity of
20 Dr. Krista S. Jacobsen for Family 3 Patents."

21 Exhibit 24 is:

22 "Reply Expert Report of Dr. Krista S.
23 Jacobsen for Family 3 Patents."

24 And 25 is:

25 "Rebuttal Expert Report on Non-infringement

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3 MR. MCANDREWS: Q. So according to Tong --
4 and -- and I'll get it out in a minute. I'm not
5 trying to -- it's not a memory test.6 But other than storing memory pointers, is
7 there -- are there -- is there any other use of memory
8 that's necessary, beyond I minus 1 times D minus 1
9 over 2?10 **A I'm not sure. I would have to look at it.**11 Q Okay. So one more question, and I think
12 we'll take a short break.13 But the -- the question is, those -- those
14 memory pointers that are stored in -- so let's call
15 it -- there's -- there's at least three bytes of
16 memory that store memory pointers in Tong's
17 implementation.18 Those memory pointers are not Reed-Solomon
19 encoded data bytes; correct?20 **A That's right.**21 Q So those memory locations are not being used
22 to store Reed-Solomon coded data bytes?23 **A That's correct.**24 Q Those are not -- those memory locations do
25 not store information that is being interleaved;

1 of Dr. Krista S. Jacobsen for Family 3 Patents."

2 I'll hand those to you.

3 **A Thank you.**4 Q Dr. Jacobsen, if you could look at those
5 briefly, and just confirm that those are the
6 three expert reports that you have submitted related
7 to Family 3 in this litigation.8 **A They do appear to be that.**9 Q Okay. I'm not actually going to have you
10 refer to any of them right now, but they're there in
11 front of you if you want to reference anything to help
12 you answer a question.13 (Documents marked Exhibits 26 - 27
14 for identification.)15 MR. MCANDREWS: I'm additionally going to
16 hand you right now what's been marked as Exhibit 26.
17 It's U.S. Patent No. 5,764,649, naming Po Tong as the
18 sole inventor.19 And Exhibit 27, which are -- which includes
20 excerpts from a book entitled:

21 "Fundamentals of DSL Technology."

22 Edited by Philip Golden, Hervé Dedieu, and
23 Krista S. Jacobsen.24 Q So Exhibit 20 -- let's actually start with
25 Exhibit 27.

13 (Pages 463 to 466)

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<p style="text-align: right;">Page 467</p> <p>1 A (Witness complies.)</p> <p>2 Q So can you tell me what Exhibit 27 is?</p> <p>3 A Exhibit 27 appears to be Chapter 9 from the</p> <p>4 book that I edited.</p> <p>5 Q Okay. And who authored Chapter 9?</p> <p>6 A Cory Modlin, M-O-D-L-I-N.</p> <div style="background-color: black; width: 100%; height: 150px; margin: 10px 0;"></div> <p>20 Q Okay. So if you could turn to -- and this</p> <p>21 is, again, an excerpt. But if you could turn to</p> <p>22 page 262.</p> <p>23 A (Witness complies.)</p> <p>24 Q And I actually think the section begins on</p> <p>25 261 in Section 9.4.1, entitled:</p>	<p style="text-align: right;">Page 469</p> <p>1 It's in Exhibit 25?</p> <p>2 A It's Exhibit 25, starting around</p> <p>3 paragraph 29.</p> <p>4 And I was responding to Dr. Cooklev's</p> <p>5 arguments and his reference of this portion of the</p> <p>6 book.</p> <p>7 Q Okay.</p> <p>8 A And in paragraph 30, I was pointing out that</p> <p>9 Dr. Modlin, in this chapter, had made clear that the</p> <p>10 amount of memory, even in a near optimal</p> <p>11 implementation, is more than Dr. Cooklev suggests was</p> <p>12 actually used.</p> <p>13 Q Okay. And so, now that we've got it in front</p> <p>14 of us, the way in which it is more -- and I think if</p> <p>15 we can refer to -- I guess it's the last paragraph in</p> <p>16 that section. But feel free to refer me elsewhere in</p> <p>17 the section. But the last paragraph in Section 9.4.1</p> <p>18 says:</p> <p>19 "The de-interleaver can work exactly the same</p> <p>20 way. With the de-interleaver, the delays are</p> <p>21 I minus 1/D minus 1, plus 1, I minus 2/D minus 1,</p> <p>22 plus 1, and so on.</p> <p>23 "The memory required for either the</p> <p>24 interleaver or de-interleaver is I minus 1 times</p> <p>25 D minus 1 over 2, plus 1, plus the memory required to</p>
<p style="text-align: right;">Page 468</p> <p>1 "Optimum Memory Implementation Using Tong's</p> <p>2 Method."</p> <p>3 Do you see that?</p> <p>4 A I do.</p> <p>5 Q Do you recall that you referenced this</p> <p>6 section of this book in your rebuttal expert report?</p> <p>7 A I recall referencing it because Dr. Cooklev</p> <p>8 had referenced it.</p> <p>9 Q Okay. And you were pointing out that an</p> <p>10 example of an interleaver, that uses more memory than</p> <p>11 I minus 1 times D minus 1 over 2 is Tong's</p> <p>12 interleaver; is that right?</p> <p>13 A I don't think that's an accurate</p> <p>14 characterization.</p> <p>15 Q Okay. If you want to -- maybe we can find</p> <p>16 where you referenced Tong.</p> <p>17 A (Witness complies.)</p> <p>18 Q Did you find where you referenced Tong?</p> <p>19 A I did.</p> <p>20 Q Okay. Can you explain to me how you relied</p> <p>21 on Tong?</p> <p>22 A Well, in -- I found one place. I should say</p> <p>23 I don't know that this is the only place.</p> <p>24 But Dr. Cooklev had --</p> <p>25 Q I'm sorry. And where is that?</p>	<p style="text-align: right;">Page 470</p> <p>1 store A, L, and U, which is typically much smaller</p> <p>2 than the interleaver or de-interleaver memory itself."</p> <p>3 Do you see that?</p> <p>4 A Yes.</p> <p>5 Q Okay. So Tong's implementation uses</p> <p>6 I minus 1 times D minus 1 over 2, plus 1, plus the</p> <p>7 memory required to store A, L, and U. So let's --</p> <p>8 let's break that down.</p> <p>9 So the first part of it, I minus 1/D minus 1</p> <p>10 over 2, that's what you would describe as the minimum</p> <p>11 amount of memory necessary to implement an interleaver</p> <p>12 or de-interleaver, given a particular I and D value;</p> <p>13 correct?</p> <p>14 A A convolutional interleaver.</p> <p>15 Q A convolutional interleaver using a</p> <p>16 triangular configuration?</p> <p>17 A That would be one way to do it.</p> <p>18 Q Okay. So since we've already spoken about</p> <p>19 what I believe is the A, L, and U, are the A, L, and</p> <p>20 U -- can you confirm that those are the memory</p> <p>21 pointers we were discussing earlier?</p> <p>22 A Yes.</p> <p>23 Q Okay. And I had -- I had asked you this</p> <p>24 question. I don't know that you had an opinion on it.</p> <p>25 But my question was: How many versions of A,</p>

14 (Pages 467 to 470)

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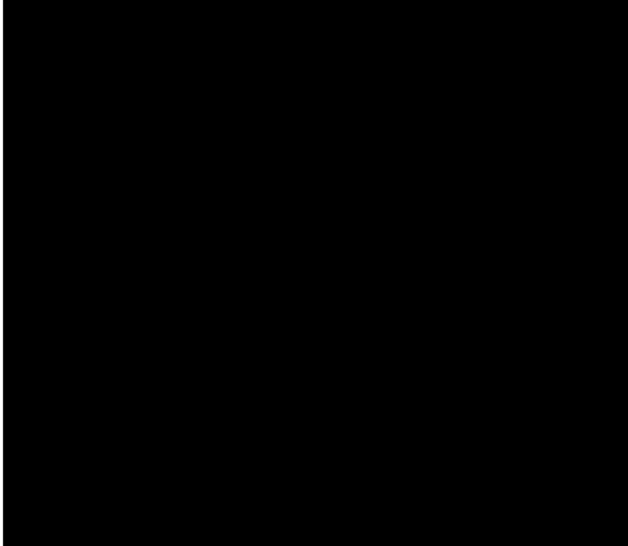
<p style="text-align: right;">Page 471</p> <p>1 L, and U are necessary to store?</p> <p>2 A Well, each of them is length I. So it would</p> <p>3 be A times I, plus L times I, plus U times I.</p> <p>4 Q You're reading the sentence that says:</p> <p>5 "In Tong's method, three arrays of length I</p> <p>6 are stored, A, L, and U, with the current address, the</p> <p>7 lower limit on the address, and the upper limit on the</p> <p>8 address, respectively."</p> <p>9 A That's right.</p> <p>10 Q Okay. And so that sentence tells us, first</p> <p>11 of all, that A is storing the pointer for the current</p> <p>12 address, L is storing the pointer for the limit on --</p> <p>13 the lower limit on the address, and U is storing the</p> <p>14 pointer for the upper limit on the address?</p> <p>15 A That's how I read it.</p> <p>16 Q Okay. And what is your understanding about</p> <p>17 the length of those pointers --</p> <p>18 A Well --</p> <p>19 Q -- in terms of bits?</p> <p>20 A It says that three arrays of length I are</p> <p>21 stored. And I -- just verifying whether he has I</p> <p>22 in -- I is in symbols. So it would be I times A</p> <p>23 symbols, L times I symbols, and U times I symbols.</p> <p>24 Q So -- so does that mean that whatever A is is</p> <p>25 stored I number of times?</p>	<p style="text-align: right;">Page 473</p> <p>1 I pointed to at the -- the last sentence of this</p> <p>2 section, it says:</p> <p>3 "The memory required to store A, L, and U,</p> <p>4 which is typically much smaller than the interleaver</p> <p>5 or de-interleaver memory itself."</p> <p>6 Do you see that?</p> <p>7 A I do.</p> <p>8 Q Do you understand that sentence to be</p> <p>9 distinguishing the memory required to store the A, L,</p> <p>10 and U from the interleaver and de-interleaver memory</p> <p>11 itself?</p> <p>12 A I understand it to be distinguishing between</p> <p>13 the memory that's used to manipulate the bytes</p> <p>14 themselves as distinct from the memory potentially</p> <p>15 where the pointers are -- are stored.</p> <p>16 Q Okay. And at least Mr. Modlin is referring</p> <p>17 to -- the memory used to store the Reed-Solomon</p> <p>18 encoded data bytes that will be manipulated, he's</p> <p>19 referring that to the interleaver/de-interleaver</p> <p>20 memory itself; right?</p> <p>21 A Well, he -- I think he's referring to memory</p> <p>22 overall. He says the memory required for the</p> <p>23 interleaver or de-interleaver is this amount plus this</p> <p>24 amount.</p> <p>25 Q Yes. So -- right, so the memory required.</p>
<p style="text-align: right;">Page 472</p> <p>1 I'm trying to understand what you mean by I</p> <p>2 multiplied by A. I mean, A is an address; right?</p> <p>3 A Right.</p> <p>4 But it says in the sentence that you read:</p> <p>5 "In Tong's method, three arrays of length I</p> <p>6 are stored."</p> <p>7 Q Is it possible what that means is that there</p> <p>8 is -- there is an A, an L, and a U, and each A, each</p> <p>9 L, each U is stored I number of times?</p> <p>10 In other words, there is a -- there are</p> <p>11 three memory pointers for each line in the</p> <p>12 interleaver, effectively, each -- each I of -- of the</p> <p>13 interleaver?</p> <p>14 A I think that's what I -- I'm saying.</p> <p>15 Q Okay.</p> <p>16 A Yes.</p> <p>17 Q I'm sorry. Okay.</p> <p>18 A I -- I think we agree on that.</p> <p>19 Q Okay. So -- so assuming that A is one byte</p> <p>20 and L is one byte and U is one byte, then there --</p> <p>21 then there would be 3 times I additional bytes of</p> <p>22 memory used to store those memory pointers?</p> <p>23 A That's how I read it.</p> <p>24 Q Okay. I'll come back to that.</p> <p>25 Then -- and you see in the -- so the sentence</p>	<p style="text-align: right;">Page 474</p> <p>1 But then he goes -- would you agree with me</p> <p>2 that he's attempting to distinguish -- in the last</p> <p>3 part of the sentence, he's trying to contrast memory</p> <p>4 required to store A, L, and U from interleaver or</p> <p>5 de-interleaver memory itself?</p> <p>6 A I see that he does that.</p> <p>7 Q Okay. And you would understand the</p> <p>8 interleaver and de-interleaver memory itself to mean</p> <p>9 the memory being used to store the Reed-Solomon</p> <p>10 encoded data bytes; correct?</p> <p>11 A I would understand that, from here to be the</p> <p>12 amount of memory I minus 1 times D minus 1 over 2,</p> <p>13 plus 1.</p> <p>14 Q Okay. Okay.</p> <p>15 Now, the plus -- let's talk about the plus 1.</p> <p>16 I -- I don't think you discuss the plus 1 in your</p> <p>17 report.</p> <p>18 But is it true that the plus 1 is there</p> <p>19 because Tong's interleaver actually implements one</p> <p>20 additional byte of delay?</p> <p>21 I'm sorry. Let me strike that.</p> <p>22 Isn't it true that the plus 1 is there</p> <p>23 because Tong's interleaver actually implements</p> <p>24 two additional bytes of end-to-end delay?</p> <p>25 A Well, it -- it -- the way that Cory has</p>

15 (Pages 471 to 474)


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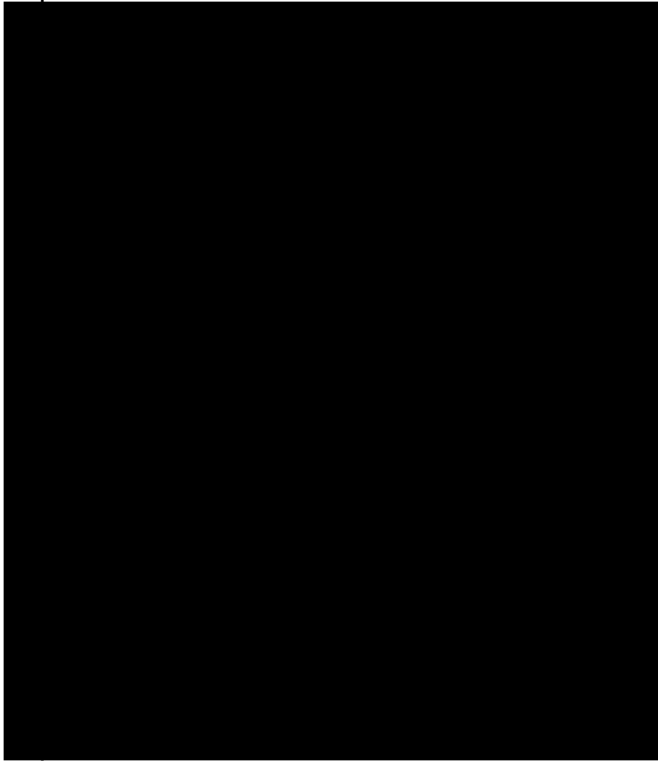
1 explained it is that:
2 "By reading and then writing the same memory
3 location each cycle, there is a fixed delay of one
4 additional symbol in the interleaver and one
5 additional symbol in the de-interleaver."
6 So that, as you said, the total delay is
7 I minus 1 times D minus 1, plus 2, end-to-end.



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16 (Pages 475 to 478)

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Page 479	Page 481
<div style="background-color: black; width: 100%; height: 100%; min-height: 300px;"></div>	<p>1 inventors participating in any standards body that you</p> <p>2 were involved in?</p> <p>3 A I don't recall.</p> <p>4 Q Do you recall whether STMicroelectronics</p> <p>5 participated in any of the DSL standards bodies you</p> <p>6 were involved in?</p> <p>7 A Yes, they did.</p> <p>8 Q Okay. Do you recall -- well, when did you</p> <p>9 first become aware of the Mazzoni reference?</p> <p>10 A During the course of this -- this litigation.</p> <p>11 Q Okay. So earlier, we had a discussion about</p> <p>12 kind of the -- the use of the term VDSL and -- and how</p> <p>13 the -- how the VDSL standards evolved over time.</p> <p>14 Do you recall that?</p> <p>15 A Yes.</p> <p>16 Q Okay. You're a patent attorney; correct?</p> <p>17 A Yes.</p> <p>18 Q So you know how to read the front page of a</p> <p>19 document or a patent with its -- essentially, its</p> <p>20 bibliographic information?</p> <p>21 A I do.</p> <p>22 Q And can you tell me, what is the priority</p> <p>23 date of the Mazzoni reference?</p> <p>24 A Well, based on the -- when you say "priority</p> <p>25 date," which -- in the U.S.?</p>
Page 480	Page 482
<div style="background-color: black; width: 100%; height: 100%; min-height: 100px;"></div> <p>8 for identification.)</p> <p>9 MR. MCANDREWS: So I'm going to hand you what</p> <p>10 we've marked as Exhibit 28.</p> <p>11 THE WITNESS: Thank you.</p> <p>12 MR. MCANDREWS: It is U.S. Patent</p> <p>13 No. 7,269,208, naming Simone Mazzoni as the first</p> <p>14 named inventor.</p> <p>15 Q Dr. Jacobsen, is Exhibit 28 the prior art</p> <p>16 reference that you rely on in your opening and reply</p> <p>17 expert reports for invalidity of the Family 3 patents?</p> <p>18 A It is one of them, yes.</p> <p>19 Q Okay. And if I refer to this as the Mazzoni</p> <p>20 reference, you'd understand that I'm referring to the</p> <p>21 '208 patent?</p> <p>22 A Yes.</p> <p>23 Q Do you know either of the named inventors?</p> <p>24 A I don't think so.</p> <p>25 Q Okay. Do you recall either of the named</p>	<p>1 Q No.</p> <p>2 So -- so the -- and I understand.</p> <p>3 So without getting into whether the claims</p> <p>4 are supported by any particular filing, what is the</p> <p>5 earliest filing date that the '208 patent claims</p> <p>6 priority to, whether U.S. or foreign?</p> <p>7 A It looks like July 18th, 2000.</p> <p>8 Q Okay. So assuming that the disclosure in</p> <p>9 this reference is effectively unchanged, except</p> <p>10 possibly a translation from French to English, is</p> <p>11 it -- is it true then that this disclosure, at the</p> <p>12 time it was filed, would be viewed in the context of</p> <p>13 the DSL art as it existed in July 18, 2000?</p> <p>14 A Could you repeat your question. I'm not sure</p> <p>15 I got it.</p> <p>16 Q So -- so the disclosure provided in the</p> <p>17 Mazzoni reference, isn't it true that it would be</p> <p>18 interpreted in view of the knowledge of one of skill</p> <p>19 in the art at the time of July 18, 2000?</p> <p>20 And -- and I'm trying -- and -- and this is</p> <p>21 not a trick question.</p> <p>22 I understand that, by the time of the filing</p> <p>23 of the Patent-in-Suit, which has -- has its own</p> <p>24 priority date, there's going to be additional</p> <p>25 information that one of skill in the art learns.</p>

17 (Pages 479 to 482)

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<p style="text-align: right;">Page 483</p> <p>1 But I'm talking about if we're just -- if</p> <p>2 we're worried about -- let's say we were worried about</p> <p>3 what the actual priority date of Mazzoni is, and</p> <p>4 Mazzoni is going to litigate his own patent. And I'm</p> <p>5 talking about the priority date of Mazzoni's patent.</p> <p>6 Isn't it true that Mazzoni's disclosure for</p> <p>7 what it teaches to one of skill in the art at the</p> <p>8 time, wouldn't it -- what -- what -- I'm sorry. Let</p> <p>9 me start over.</p> <p>10 Isn't it true that -- that Mazzoni's priority</p> <p>11 date would be based on what he discloses to one of</p> <p>12 ordinary skill in the art as of July 18, 2000?</p> <p>13 MS. WALSH: Objection; calls for a legal</p> <p>14 conclusion.</p> <p>15 THE WITNESS: Yeah, I'm not sure I'm in a</p> <p>16 position to -- to say.</p> <p>17 MR. MCANDREWS: Okay. Let me try this a</p> <p>18 different way.</p> <p>19 Q So Mazzoni in column 1, beginning at about</p> <p>20 line 19, says:</p> <p>21 "The present invention may advantageously be</p> <p>22 applied to a very high rate digital subscriber line</p> <p>23 (VDSL) environment or system, for example, though the</p> <p>24 invention may also be used in other applications."</p> <p>25 Do you see that?</p>	<p style="text-align: right;">Page 485</p> <p>1 defined for both.</p> <p>2 Q And what documents would one of skill in the</p> <p>3 art at that time have found in those schemes?</p> <p>4 A So at that time, there would have been</p> <p>5 publicly available T1/E1.4 documents. The DMT group</p> <p>6 was called the VDSL Alliance, and the single carrier</p> <p>7 group was called the VDSL Coalition. So that's where</p> <p>8 a person of ordinary skill would go look. They'd go</p> <p>9 look for documents by those two groups.</p> <p>10 Q Okay. So -- and in what time frame?</p> <p>11 So as of July 18, 2000, you think those were</p> <p>12 available --</p> <p>13 A Yes.</p> <p>14 Q -- publicly?</p> <p>15 A Yes.</p> <p>16 Q Okay. The implementation details of the</p> <p>17 initialization process that is found in those, is that</p> <p>18 exactly what was ultimately used in 993.1, the version</p> <p>19 dated in 2004 that you rely on?</p> <p>20 A I don't know for sure. But the -- the</p> <p>21 members, if -- if you will, or the participants in the</p> <p>22 VDSL Alliance, for example, were the same people who</p> <p>23 were participating in the development of G.993.1. So</p> <p>24 it wouldn't surprise me if it -- if it ended up being</p> <p>25 exactly what had been disclosed there. It might have</p>
<p style="text-align: right;">Page 484</p> <p>1 A I do.</p> <p>2 Q Okay. So VDSL, as it existed in July 18,</p> <p>3 2000, was not yet a well-defined concept; correct?</p> <p>4 A Well, I'm not sure I would agree with you</p> <p>5 there. It had been discussed a lot in the standards</p> <p>6 bodies. What was not clear is what line code it was</p> <p>7 going to use, whether it would be single carrier or</p> <p>8 multi-carrier.</p> <p>9 But for example, there had been studies on</p> <p>10 the -- what the power spectrum should look like, for</p> <p>11 example, and what kinds of data rates would need to be</p> <p>12 supported, and whether it would be only asymmetrical,</p> <p>13 or asymmetrical plus symmetrical, or something in</p> <p>14 between.</p> <p>15 So there were a lot of system requirements</p> <p>16 laid out, the assumption being that the line code</p> <p>17 selection could be put off. Much -- much of it could</p> <p>18 be defined without that level of detail.</p> <p>19 Q Okay. So for example, as of July 2000 -- as</p> <p>20 of July 2000, had the specific details of the</p> <p>21 initialization process of VDSL been completed?</p> <p>22 A Yes, in two tracks. There were -- there was</p> <p>23 the single carrier camp plowing away on their version</p> <p>24 of VDSL, and then there was the DMT camp also doing</p> <p>25 the same. So there were initialization schemes</p>	<p style="text-align: right;">Page 486</p> <p>1 been based on that and modified somewhat. I -- I</p> <p>2 don't remember.</p> <p>3 Q Okay. And -- and you don't know any of the</p> <p>4 specific changes that were made between the 993.1</p> <p>5 version that you rely on and -- and any version that</p> <p>6 existed as of July 2000?</p> <p>7 A I would have to look at them.</p> <p>8 Q Okay.</p> <p>9 A I would have to compare. I have not</p> <p>10 compared.</p> <p>11 Q And you didn't do that for the purpose of</p> <p>12 your opinion in the case?</p> <p>13 A I did not.</p> <p>14 Q Okay. And given that Mazzoni's disclosure</p> <p>15 refers generically to VDSL, without referencing any</p> <p>16 particular standards body or standards document, one</p> <p>17 of skill in the art reading this document, Mazzoni,</p> <p>18 would not know which one, if any of those, Mazzoni</p> <p>19 intended; correct?</p> <p>20 MS. WALSH: Objection; incomplete</p> <p>21 hypothetical.</p> <p>22 THE WITNESS: When you say "which one," what</p> <p>23 are you referring to?</p> <p>24 MR. MCANDREWS: Well, so you referenced that</p> <p>25 there were publications about VDSL as of this date.</p>

18 (Pages 483 to 486)

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<p style="text-align: right;">Page 487</p> <p>1 And apparently, although you haven't described them as 2 part of the case, there were initialization processes 3 proposed at that time. 4 Q To the extent that that's true, you wouldn't 5 know, from reading Mazzoni, which, if any of those, he 6 had in mind; correct? 7 A You wouldn't. But you also wouldn't need to 8 know, because what he's talking about is -- is that 9 the higher layer than the initialization would be 10 conducted. 11 Q Okay. Isn't it possible -- so you referenced 12 some work that you did with Amati, that was a 13 proprietary version -- 14 A Uh-huh. 15 Q -- of VDSL; correct? 16 A Yes. 17 Q Okay. Isn't it possible that Mazzoni at 18 STMicroelectronics had a version of VDSL in mind, that 19 was not going to follow any particular standard, even 20 the draft ones that were proposed at the time? 21 A I think that's unlikely, because VDSL started 22 out as a -- a standard. It was proposed in the 23 standard. So I don't think that he would have thought 24 he had a proprietary implementation. 25 Q Well, you said that Amati had a proprietary</p>	<p style="text-align: right;">Page 489</p> <p>1 But that dispute has a huge impact in a lot 2 of ways at the physical layer -- at the lowest part of 3 the physical layer. 4 But there are things that both kinds of 5 solutions would need to do that would be common, and 6 those are the kinds of things that typically were 7 discussed. 8 MR. MCANDREWS: Well, you're saying that -- 9 you're saying those would need to do. 10 Q But you agree with me that the -- the 11 standards process was in flux? 12 A In many respects, it was. 13 Q And particularly as of July 2000; correct? 14 A There was no line code decision at that 15 point. 16 Q And -- and there's -- there's no reason why 17 Mazzoni, at that time, could not have been 18 contemplating his own proprietary version of VDSL; 19 right? 20 A The fact that he refers to VDSL suggests an 21 awareness of the standards process. 22 And the fact that he doesn't mention, at 23 least I didn't think he mentioned, the line code for 24 which he's proposing this approach, suggests to me 25 that it's a -- an approach that is not tied to the</p>
<p style="text-align: right;">Page 488</p> <p>1 implementation. 2 Is there some reason why STMicroelectronics 3 could not? 4 Did -- did Amati have a monopoly on that 5 market? 6 A No. When I said we have a -- had a 7 proprietary solution, it was because we were proposing 8 it for the standard. We created it. We built it to 9 show that it would work. And in parallel, we proposed 10 it in the standards bodies. And presumably, ST was 11 maybe doing the same thing. 12 Q Okay. But given that VDSL1 continued to be 13 developed through at least 2004, and VDSL2 continued 14 to be developed -- well, it's currently being 15 developed, but the first version was -- was approved 16 in 2006, isn't it possible that he was also going to 17 be proposing ideas for those standards that were 18 different than those already proposed? 19 MS. WALSH: Objection; incomplete 20 hypothetical. 21 THE WITNESS: It's possible. 22 But again, the -- the key dispute in VDSL, 23 and the reason why it took so long, was because 24 there -- there was no agreement on the line code, 25 whether it was DMT or -- or single carrier.</p>	<p style="text-align: right;">Page 490</p> <p>1 issues that were in flux at the time. 2 Q Okay. So he could have been contemplating 3 either the capped version or the DMT version, for 4 example; right? 5 A He could have been. 6 Q Okay. And -- and I think you said before 7 that there is a different initialization process, 8 depending on which one you have; right? 9 A There are some different aspects, yes. 10 Q Okay. And given that the final 11 implementation details of any particular VDSL standard 12 were still in flux at this time, you're not saying 13 that STMicroelectronics wouldn't be allowed to propose 14 changes to the standards; right? 15 A I am not saying that. 16 Q Okay. So they certainly could have been 17 coming up with some implementation details of their 18 own, that they could have kept as pri- -- proprietary, 19 or they could have been proposing to the -- the 20 development of the VD -- the ITU VDSL standards; 21 correct? 22 MS. WALSH: Objection; compound; calls for 23 speculation. 24 THE WITNESS: I don't know what they did. 25 MR. MCANDREWS: Okay.</p>

19 (Pages 487 to 490)

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<p style="text-align: right;">Page 491</p> <p>1 Q So let's talk about Mazzoni in particular</p> <p>2 now.</p> <p>3 So you have some opinions about Mazzoni. If</p> <p>4 you want to refer to those aspects of your written</p> <p>5 reports, please do.</p> <p>6 So one thing that I want to -- I want to nail</p> <p>7 down -- because there seems to be disagreement over</p> <p>8 what your position was in the opening report. And as</p> <p>9 you may know, in our view, there was even some</p> <p>10 conflict in your opening report on the topic.</p> <p>11 But the issue is the I and M parameters that</p> <p>12 are used by -- by Mazzoni.</p> <p>13 Dr. Cooklev had interpreted your opening</p> <p>14 report as suggesting that the I and M parameters are</p> <p>15 something that is exchanged between the transceivers</p> <p>16 in Mazzoni's system during some theoretical</p> <p>17 initialization process.</p> <p>18 Do you recall that in Dr. Cooklev's report?</p> <p>19 A I don't specifically recall that. But I</p> <p>20 don't believe that that was how I characterized</p> <p>21 Mazzoni.</p> <p>22 Q Okay. So -- so let me ask you -- since --</p> <p>23 since there seems to be some confusion, I want to -- I</p> <p>24 want to tamp it down and put it to rest.</p> <p>25 Do you believe that Mazzoni discloses</p>	<p style="text-align: right;">Page 493</p> <p>1 combi- -- combinations and six symmetric bit rate --</p> <p>2 bit rates, I believe.</p> <p>3 Q Okay. And I think he refers to those as --</p> <p>4 for the asymmetric, it's A1 through A6; is that right?</p> <p>5 A I believe that is right.</p> <p>6 Q I think, if you look at the top of column 4,</p> <p>7 you might find that.</p> <p>8 A (Witness complies.)</p> <p>9 Right.</p> <p>10 Q Okay. And there are also six symmetrical</p> <p>11 services, S1 through S6, that I think you can find at</p> <p>12 the bottom of column 3.</p> <p>13 A That's right.</p> <p>14 Q Okay. And each service is defined as a -- an</p> <p>15 upstream bit rate and a downstream bit rate; is that</p> <p>16 correct?</p> <p>17 A I believe that is correct.</p> <p>18 Q Okay. And then, so would it be your</p> <p>19 understanding that, for each of the 12 services, there</p> <p>20 is a corresponding I, M, I prime, and M prime that is</p> <p>21 stored in Mazzoni's table?</p> <p>22 A That is my understanding of -- of the</p> <p>23 preferred embodiment.</p> <p>24 Q Okay. And Mazzoni also then explains how</p> <p>25 much memory for interleaving and de-interleaving it</p>
<p style="text-align: right;">Page 492</p> <p>1 exchanging I and M parameters during initialization?</p> <p>2 A I believe my opinion was and has always been</p> <p>3 that Mazzoni stores particular values of I and M and</p> <p>4 I prime and M prime in a table.</p> <p>5 Q Okay. And -- and --</p> <p>6 A I'm trying to --</p> <p>7 Q -- at the bottom of column 6, I think, is</p> <p>8 maybe what you're referencing.</p> <p>9 A (Witness complies.)</p> <p>10 That's right.</p> <p>11 Q Okay. So I -- so the I and M values, and the</p> <p>12 I prime and M prime values that will be used by</p> <p>13 Mazzoni's device, they're stored in a table; correct?</p> <p>14 A The understanding that I have is that in</p> <p>15 advance, Mazzoni defines particular services, and for</p> <p>16 each one, at least one set of I, M, I prime, M prime,</p> <p>17 and then stores a table with those sets of parameters.</p> <p>18 Q Okay. And -- and those sets of parameters</p> <p>19 are indexed per service?</p> <p>20 A I believe it's per bit rate combination</p> <p>21 within the service, or per downstream bit rate and</p> <p>22 upstream bit rate.</p> <p>23 Q Okay. And the -- and the services that</p> <p>24 Mazzoni describes, there's 12 of them; is that right?</p> <p>25 A I'm -- he describes six asymmetric bit rate</p>	<p style="text-align: right;">Page 494</p> <p>1 will require, depending on the service; is that</p> <p>2 correct?</p> <p>3 A I believe Mazzoni discloses figuring out the</p> <p>4 maximum that you might need, based on the services to</p> <p>5 be provided. And then that's how he figures out how</p> <p>6 much memory the transceiver must have.</p> <p>7 Q So for example, if we look at the top of</p> <p>8 column 6, and really run -- so running from about --</p> <p>9 well, running almost nearly the entire length of</p> <p>10 column 6, from the top down through line 51 that we</p> <p>11 were talking about earlier about the tables.</p> <p>12 So the paragraph that begins at 51 is the</p> <p>13 tables; right?</p> <p>14 A Correct.</p> <p>15 Q Okay. So -- so column 6 is describing the</p> <p>16 manner in which Mazzoni determines the amount of</p> <p>17 memory that will be required to support any particular</p> <p>18 service; correct?</p> <p>19 A I believe he's figuring out the amount of</p> <p>20 memory that must be included in order to support the</p> <p>21 service that requires the most memory --</p> <p>22 Q Okay.</p> <p>23 A -- for interleaving and de-inter- --</p> <p>24 de-interleaving.</p> <p>25 Q Okay. And we can step through this in a</p>

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<p style="text-align: right;">Page 495</p> <p>1 little more detail.</p> <p>2 But do you recall, at least, that Dr. Cooklev</p> <p>3 concluded, that the amount of memory required in the</p> <p>4 Mazzoni-described device, would be dependent on the</p> <p>5 amount of memory required for the highest asymmetrical</p> <p>6 service?</p> <p>7 A I don't specifically recall that.</p> <p>8 Q Okay. So -- so let me -- so essentially,</p> <p>9 what Mazzoni is describing -- and you can tell me if</p> <p>10 you think I'm incorrect, or if you don't have an</p> <p>11 understanding one way or the other.</p> <p>12 Mazzoni is describing that -- first of all,</p> <p>13 he explains that for -- and this is beginning at</p> <p>14 column 6, line 11, and then concluding at about</p> <p>15 line 30.</p> <p>16 Mazzoni is describing the amount of memory</p> <p>17 that is required for the downstream direction in his</p> <p>18 A6 service, where he concludes that the resulting</p> <p>19 memory space is therefore equal to 24,960 bytes.</p> <p>20 Do you see that?</p> <p>21 A I do.</p> <p>22 Q Do you recall, is that consistent with your</p> <p>23 recollection of what Mazzoni is doing there to arrive</p> <p>24 at the 24,960-byte number?</p> <p>25 A My understanding is that he's figuring out</p>	<p style="text-align: right;">Page 497</p> <p>1 is the most that will ever be needed to support any of</p> <p>2 the 12 services; right?</p> <p>3 A That's my understanding of this example, yes.</p> <p>4 Q Okay. So for example, the S6 service, so the</p> <p>5 symmetrical service with the highest data rate -- and</p> <p>6 I don't know that Mazzoni necessarily does the</p> <p>7 calculations. I think that Dr. Cooklev may have done</p> <p>8 the calculations using the equations that Mazzoni</p> <p>9 describes.</p> <p>10 But essentially, what Dr. Cooklev concluded</p> <p>11 is that, for the symmetrical service, approximately</p> <p>12 11,000 bytes would be required for each direction.</p> <p>13 Do you have any reason to believe that that's</p> <p>14 not an accurate calculation for the -- for the S6</p> <p>15 service?</p> <p>16 A I did not do the calculation myself, so I --</p> <p>17 I don't -- I don't know.</p> <p>18 MR. MCANDREWS: Okay. We need to go off the</p> <p>19 record here for a minute to change tape.</p> <p>20 THE VIDEOGRAPHER: This marks the end of</p> <p>21 Videotape No. 1, Volume III, in the deposition of</p> <p>22 Dr. Krista Jacobsen.</p> <p>23 The time is now 11:19. Going off the record.</p> <p>24 (Recess taken.)</p> <p>25 THE VIDEOGRAPHER: Going on the record.</p>
<p style="text-align: right;">Page 496</p> <p>1 worst case how much memory he needs for downstream.</p> <p>2 Q "Worst case" being the A6 service?</p> <p>3 A The highest bit rate service.</p> <p>4 Q Okay. And then the next paragraph, beginning</p> <p>5 at about line 31, and going through line 36 of</p> <p>6 column 6, he explains that an additional 1,920 bytes</p> <p>7 are needed for the upstream direction in the A6</p> <p>8 service?</p> <p>9 A That's my understanding.</p> <p>10 Q Okay. And so that means that the total</p> <p>11 amount of memory, that the Mazzoni device will require</p> <p>12 to support the A6 service, is 26,880 bytes.</p> <p>13 Do you see that?</p> <p>14 A Yes.</p> <p>15 Q Okay. And is it your understanding of the</p> <p>16 Mazzoni reference then that the device would be</p> <p>17 provided with approximately 26,880 bytes of memory,</p> <p>18 and then, depending on the service, that memory would</p> <p>19 be used for either interleaving or de-interleaving?</p> <p>20 A That -- my understanding is that the purpose</p> <p>21 of this analysis in Mazzoni is to figure out the size</p> <p>22 of the memory needed. And then the memory would</p> <p>23 actually be allocated for interleaving and</p> <p>24 de-interleaving, depending on which service is in use.</p> <p>25 Q Okay. And -- and the idea is that the 26,880</p>	<p style="text-align: right;">Page 498</p> <p>1 This marks the beginning of Videotape No. 2,</p> <p>2 Volume III, in the deposition of Dr. Krista Jacobsen.</p> <p>3 The time is now 11:30.</p> <p>4 MR. MCANDREWS: Q. So before the -- the</p> <p>5 break there, we were talking about some specific</p> <p>6 amounts of memory that Mazzoni is using for the</p> <p>7 various services.</p> <p>8 And I don't want to get bogged down in the</p> <p>9 precise numbers of bytes, because I don't think that's</p> <p>10 the important point that I'm trying to explore here.</p> <p>11 So -- because I don't think they're necessary to the</p> <p>12 point.</p> <p>13 So -- so let me -- let me just -- let's --</p> <p>14 let's set up a Mazzoni device, and you can tell me if</p> <p>15 there's something that is wildly misrepresenting</p> <p>16 Mazzoni or misrepresenting Mazzoni.</p> <p>17 But -- so let's assume that Mazzoni has --</p> <p>18 and I'll use round numbers -- has 27,000 bytes of</p> <p>19 memory that is necessary for the A6 service; okay?</p> <p>20 A Okay.</p> <p>21 Q Okay. And that no other of the</p> <p>22 11 services -- or no other of the 12 total services</p> <p>23 requires any more than 27,000 bytes of memory.</p> <p>24 A Okay.</p> <p>25 Q Okay. And let's also assume that the S6</p>

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<p style="text-align: right;">Page 499</p> <p>1 service requires 11,000 bytes in each direction, for a</p> <p>2 total of 22,000 bytes.</p> <p>3 A Okay.</p> <p>4 Q And so given that setup, I want to talk about</p> <p>5 an aspect of your report, where Doctor -- where you're</p> <p>6 responding to Dr. Cooklev's argument that, if all of</p> <p>7 the devices exchanged with each other was the maximum</p> <p>8 amount of memory that either device had to support in</p> <p>9 a particular direction, that that would essentially</p> <p>10 break Mazzoni.</p> <p>11 Do you recall Dr. Cooklev's argument?</p> <p>12 A I recall it generally, but I don't recall the</p> <p>13 specifics. I would have to look at my report.</p> <p>14 Q Okay. So -- and let me -- let me -- one part</p> <p>15 of the -- the -- the scenario I set up, I forgot to</p> <p>16 say that, let's assume that in the A6 service, the</p> <p>17 downstream direction requires 26,000 -- or let's go</p> <p>18 with 25,000. Let's go with 25,000, that the A6</p> <p>19 service requires 25,000 of the 27,000 total bytes of</p> <p>20 memory available.</p> <p>21 A Okay.</p> <p>22 Q Okay. So if, hypothetically, the LB-031</p> <p>23 messaging scheme was added to Mazzoni -- and that's --</p> <p>24 that's a prior art combination that you suggest</p> <p>25 renders the claims obvious; correct?</p>	<p style="text-align: right;">Page 501</p> <p>1 THE REPORTER: 29.</p> <p>2 MR. MCANDREWS: 29, I believe.</p> <p>3 THE REPORTER: 29. Correct.</p> <p>4 (Document marked Exhibit 29</p> <p>5 for identification.)</p> <p>6 MR. MCANDREWS: So I'm going to hand you what</p> <p>7 we've marked as Exhibit No. 29. Exhibit 29 is a</p> <p>8 document entitled:</p> <p>9 ITU - Telecommunications Sector" --</p> <p>10 I'm sorry. Let me start over.</p> <p>11 "ITU - Telecommunications Standardization</p> <p>12 Sector, Study Group 15, Luven, 14-18 June, 2004.</p> <p>13 Temporary Document LB-031."</p> <p>14 Q Did I accurately describe that document?</p> <p>15 A That is correct.</p> <p>16 Q Okay. And can we refer to this document as</p> <p>17 LB-031?</p> <p>18 A Yes.</p> <p>19 Q Can you tell me generally what -- what LB-031</p> <p>20 is?</p> <p>21 A Sure.</p> <p>22 This was a contribution to a meeting of Study</p> <p>23 Group 15, Question 4 in June of 2004. And that was</p> <p>24 the group that was standardizing -- well, primarily</p> <p>25 responsible for standardizing ADSL, VDSL, and other</p>
<p style="text-align: right;">Page 500</p> <p>1 A Right.</p> <p>2 Q Okay. So if LB-031 was added, and therefore,</p> <p>3 what was exchanged was only the maximum capability of</p> <p>4 each device in a given direction, and so what was</p> <p>5 exchanged by each side or -- or let's just say what</p> <p>6 was exchanged from Mazzoni's device was, I can support</p> <p>7 up to 25,000 bytes of memory downstream, and I can</p> <p>8 support up to 11 bytes of memory -- 11,000 bytes of</p> <p>9 memory upstream, isn't it true that that device would</p> <p>10 not be able to work, because you would then require a</p> <p>11 total of 36,000 bytes of memory?</p> <p>12 MS. WALSH: Objection; incomplete</p> <p>13 hypothetical.</p> <p>14 THE WITNESS: I'm not sure I understand</p> <p>15 the -- the setup.</p> <p>16 MR. MCANDREWS: Okay.</p> <p>17 Q Can -- can you tell me what you don't</p> <p>18 understand about my setup?</p> <p>19 A I'm not sure -- the -- the LB-031 aspect that</p> <p>20 you're introducing, I'm -- I'm not sure I completely</p> <p>21 understand what your -- what your hypothetical is.</p> <p>22 MR. MCANDREWS: Okay. Can we -- can we get</p> <p>23 the LB-031 reference?</p> <p>24 I'm sorry. What -- what exhibit number are</p> <p>25 we on, if you know?</p>	<p style="text-align: right;">Page 502</p> <p>1 types of DSL.</p> <p>2 Q Okay. And there's a -- there's a range of</p> <p>3 dates, I guess, June 14 through 18, 2004.</p> <p>4 What does that mean?</p> <p>5 A That would be the -- the dates of the meeting</p> <p>6 at which this contribution was presented, discussed,</p> <p>7 submitted.</p> <p>8 Q Okay. Do you know if you attended any</p> <p>9 meeting at which LB-031 was discussed?</p> <p>10 A I -- it may have been discussed at one or</p> <p>11 more meetings. I don't have any specific recollection</p> <p>12 of it.</p> <p>13 Q Were you working for TI at this time?</p> <p>14 A No. I had left TI.</p> <p>15 Q Okay. Did you have any involvement in the</p> <p>16 creation of this contribution?</p> <p>17 A Not that I recall.</p> <p>18 Q Okay. So in -- so you had asked me -- well,</p> <p>19 you had explained that you weren't certain what aspect</p> <p>20 of LB-031 I was referring to.</p> <p>21 And so generally, LB-031 is directed to</p> <p>22 exchanging information during initialization of a</p> <p>23 VDSL2 modem; is that correct?</p> <p>24 A That's right.</p> <p>25 Q And is it fair to say that one of the unique</p>

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<p style="text-align: right;">Page 503</p> <p>1 aspects of LB-031 is it's proposing to exchange</p> <p>2 information about milliseconds of delay, as opposed to</p> <p>3 simply, for example, bytes of delay?</p> <p>4 A I don't know that I would say that's</p> <p>5 necessarily unique, because the idea of delay being</p> <p>6 measured in milliseconds is -- was -- was known.</p> <p>7 Q Okay. So that was known as a concept.</p> <p>8 But -- but -- so -- so what is the unique</p> <p>9 aspect, if any, of LB-031?</p> <p>10 A The -- well, I think there are several unique</p> <p>11 aspects, among them the idea of, instead of specifying</p> <p>12 interleaving complexity as an amount of memory, or by</p> <p>13 the interleaver depth, you would specify it in</p> <p>14 milliseconds to remove the dependence of the amount of</p> <p>15 memory on the data rate that's supported. So you --</p> <p>16 you basically cancel that out of the calculation.</p> <p>17 And then the idea of sending information from</p> <p>18 one transceiver to the other, regarding its</p> <p>19 interleaving capabilities, is the other -- one of the</p> <p>20 other big ideas.</p> <p>21 Q Okay. So -- so let me attempt to</p> <p>22 characterize what some of the information is that is</p> <p>23 exchanged. You tell me if it's accurate.</p> <p>24 So during -- during the initialization</p> <p>25 process, the CO and the CPE would exchange the maximum</p>	<p style="text-align: right;">Page 505</p> <p>1 would then select the smaller of the transmitter and</p> <p>2 receiver capabilities in each direction as the</p> <p>3 end-to-end capabilities."</p> <p>4 Do you see that?</p> <p>5 A I do.</p> <p>6 Q Okay. So for example, if Mazzoni was one of</p> <p>7 the two transceivers, if Mazzoni was the VTU-R, for</p> <p>8 example, and Mazzoni says that the maximum I can</p> <p>9 support in the downstream direction is 25,000, and the</p> <p>10 maximum I can support in the upstream direction is</p> <p>11 11,000, and the -- and the other side then specified,</p> <p>12 let's say, those same amounts, 11,000 and 25,000.</p> <p>13 So then the devices select the smaller of the</p> <p>14 transmitter and receiver capabilities. But in this</p> <p>15 case, they agreed they were the same amount. So in</p> <p>16 other words, they would attempt to use 25,000 in the</p> <p>17 downstream direction, and 11,000 in the upstream</p> <p>18 direction.</p> <p>19 Is there something wrong with that scenario?</p> <p>20 A As far as I understand what LB-031 is</p> <p>21 proposing, it's -- it's the delay in terms of octets,</p> <p>22 which includes the transmitter and receiver, as -- as</p> <p>23 we discussed.</p> <p>24 Q Okay. So -- so is part of the problem that I</p> <p>25 need to double those numbers?</p>
<p style="text-align: right;">Page 504</p> <p>1 number of bytes of delay that it -- that it can</p> <p>2 support in any particular direction; is that true?</p> <p>3 A It says that the VTU-0 and the VTU-R exchange</p> <p>4 the interleaver delay in terms of octets.</p> <p>5 Q Okay. And you're referring to, I guess, on</p> <p>6 page 3.</p> <p>7 And let me -- just for -- for the record</p> <p>8 here, so LB-031 was produced at Bates</p> <p>9 No. 2WIRE00030957 through '30963.</p> <p>10 And what I'm referring to is on native</p> <p>11 page 3, Bates No. '30959.</p> <p>12 Were you referring to that paragraph?</p> <p>13 A Yes.</p> <p>14 Q Okay. And the paragraph is the</p> <p>15 second-to-last paragraph that appears on that page?</p> <p>16 A That's right.</p> <p>17 Q Okay. And that states:</p> <p>18 "For interoperability reasons, the VTU-0 and</p> <p>19 VTU-R must exchange the interleaver delay, in terms of</p> <p>20 octets. The requirement is that the interleaver delay</p> <p>21 and octets be sufficient to satisfy the smallest</p> <p>22 maximum delay, even at the highest supported data</p> <p>23 rate. If a VDSL2 implementation supports a larger</p> <p>24 interleaver memory than is required, it should be free</p> <p>25 to specify the larger value. The VTU-0 and VTU-R</p>	<p style="text-align: right;">Page 506</p> <p>1 So -- so let's say that Mazzoni was going to</p> <p>2 be implementing a triangular interleaver.</p> <p>3 Is it that to support -- Mazzoni would be</p> <p>4 supporting, I guess, 50,000 bytes of delay if he had</p> <p>5 25,000 bytes of memory for the downstream direction?</p> <p>6 Is that the issue with my scenario?</p> <p>7 A Not exactly.</p> <p>8 If you look at the example on the next page</p> <p>9 of LB-031, I think that helps explain what LB-031 had</p> <p>10 in mind.</p> <p>11 So he talks about the minimum interleaver</p> <p>12 delay requirement being 5.23 milliseconds,</p> <p>13 corresponding to a particular delay in octets of</p> <p>14 29,092 octets, which means it would need at least half</p> <p>15 of that amount of memory.</p> <p>16 And then he -- this -- in this example, the</p> <p>17 VDSL transceiver would indicate it supports up to this</p> <p>18 bit rate and this amount, these 29,092 or more octets</p> <p>19 of interleaver delay.</p> <p>20 And then the two transceivers would agree on</p> <p>21 the bit rates and the actual amount of delay.</p> <p>22 Q Okay. But -- but isn't it true that, in</p> <p>23 LB-031, once they have exchanged the maximum that they</p> <p>24 can use in each direction as the end-to-end</p> <p>25 capabilities, that either device, whichever one wants</p>

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<p style="text-align: right;">Page 507</p> <p>1 to make the proposal, can use up to that amount for</p> <p>2 each -- for -- for the direction that it specified</p> <p>3 that amount for?</p> <p>4 A Can you repeat your question?</p> <p>5 I'm not sure I understood --</p> <p>6 Q Okay. So --</p> <p>7 A -- exactly.</p> <p>8 Q -- so once the exchange, that is described on</p> <p>9 page 3 occurs, which is for each device to specify the</p> <p>10 amount of memory that it supports in a given</p> <p>11 direction, and then the two transceivers pick the</p> <p>12 smaller of those capabilities. So you've arrived at a</p> <p>13 number for upstream and a number for downstream. And</p> <p>14 whether that's specified in -- well, I guess it's</p> <p>15 specified in -- in delay in terms of octets.</p> <p>16 Once that's been specified, what will be used</p> <p>17 by the devices is any number up to that amount in each</p> <p>18 direction?</p> <p>19 A So the -- the context of -- of LB-031 is that</p> <p>20 one of the two transceivers has more memory than the</p> <p>21 other, and they're trying to negotiate parameters that</p> <p>22 would work for both of the -- of the transceivers.</p> <p>23 The hypothetical you gave me from Mazzoni is</p> <p>24 a little bit different, because in that case, you set</p> <p>25 it up as the maximum in each direction, without</p>	<p style="text-align: right;">Page 509</p> <p>1 direction independently, you don't disagree with</p> <p>2 Dr. Cooklev that that would not work with Mazzoni;</p> <p>3 correct?</p> <p>4 A I don't think that's what LB031 suggests</p> <p>5 doing.</p> <p>6 Q What do you mean?</p> <p>7 That's -- I mean, that's exactly what it says</p> <p>8 it's doing on page 3.</p> <p>9 And -- and I know you have an opinion about</p> <p>10 what it might suggest to one of skill in the art, but</p> <p>11 let's -- can we -- can we set that aside?</p> <p>12 I want to talk about the specific example.</p> <p>13 A Right.</p> <p>14 Q Because you have -- you have a disagreement</p> <p>15 with it, I want to try to understand the basis for</p> <p>16 your disagreement, where you call his argument</p> <p>17 specious. I'm trying to -- I'm trying to get to that</p> <p>18 point.</p> <p>19 And on page 111, you seem to be suggesting</p> <p>20 that it's specious -- specious because it would be</p> <p>21 trivial to select a different size memory; okay?</p> <p>22 So -- so to get to that point, it sounds like</p> <p>23 you agree that, if you literally used only messaging</p> <p>24 that said, "This is my maximum downstream, and this is</p> <p>25 my maximum upstream," and then the devices could use</p>
<p style="text-align: right;">Page 508</p> <p>1 consideration of the fact that that total exceeds</p> <p>2 the -- the total that they have.</p> <p>3 So I don't think that hypothetical works.</p> <p>4 Q Correct. And that was our point -- that was</p> <p>5 Dr. Cooklev's point, and you said that his argument</p> <p>6 was specious.</p> <p>7 A And where is -- where is this?</p> <p>8 Q This is in the middle of page 111, for</p> <p>9 example, in your expert reply report. You state:</p> <p>10 "This argument is specious because it would</p> <p>11 be trivial to one of ordinary skill in the art to</p> <p>12 select a different size memory for the</p> <p>13 interleaver/de-interleaver pair."</p> <p>14 A Right.</p> <p>15 And I think what I was referring to here is</p> <p>16 that the Mazzoni VTU-0 would not receive this message</p> <p>17 having 2- -- sorry -- 24,960 bytes and 10,860 bytes,</p> <p>18 because that would exceed the total amount of memory</p> <p>19 available.</p> <p>20 Q Right.</p> <p>21 So you -- but -- so you don't disagree that,</p> <p>22 if Mazzoni tried to use what LB-031 was contemplating,</p> <p>23 you don't disagree that -- you -- I'm sorry.</p> <p>24 If Mazzoni used LB031's messages that simply</p> <p>25 exchanged the maximum that was available for each</p>	<p style="text-align: right;">Page 510</p> <p>1 up to that amount, it sounds like you don't challenge</p> <p>2 Dr. Cooklev's argument that that wouldn't work with</p> <p>3 Mazzoni; correct?</p> <p>4 A I don't think that would work, but I also</p> <p>5 don't think that that's what LB-031 suggests doing.</p> <p>6 Q Okay. Let me -- let me stop there. So --</p> <p>7 and we can get to that in a minute.</p> <p>8 But that wasn't your response in your reply.</p> <p>9 Your response was not that that's not what LB-031</p> <p>10 teaches me. Your response was:</p> <p>11 "That argument is specious because it would</p> <p>12 be trivial to select a different size memory."</p> <p>13 And I want to understand what you mean by</p> <p>14 that.</p> <p>15 A Well, I think, as I interpreted his argument</p> <p>16 here, he was assuming that the Mazzoni memory would</p> <p>17 always be limited to this -- whatever it turned out to</p> <p>18 be, 26,880 bytes.</p> <p>19 Q Okay.</p> <p>20 A And -- and that I don't think is true if -- a</p> <p>21 person having ordinary skill reading Mazzoni would</p> <p>22 understand that, if there were higher bit rate</p> <p>23 services defined, for example, that that size memory</p> <p>24 would increase.</p> <p>25 Q Okay. So let me understand that.</p>

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<p style="text-align: right;">Page 511</p> <p>1 So Mazzoni does not describe higher bit rate</p> <p>2 services; right?</p> <p>3 A Not explicitly.</p> <p>4 Q Okay. In fact, one of the benefits of</p> <p>5 Mazzoni is that he only has to have 27,000 bytes of</p> <p>6 memory total to support each of his 12 services;</p> <p>7 right?</p> <p>8 A He discloses minimizing the amount of memory</p> <p>9 necessary for interleaving and de-interleaving.</p> <p>10 Q Okay. So -- so given -- given the numbers we</p> <p>11 talked through before -- let me -- let me do them</p> <p>12 again.</p> <p>13 So we -- so the argument was, there are</p> <p>14 27,000 total bytes of memory. There -- there's 25,000</p> <p>15 required for downstream and 11,000 required for</p> <p>16 upstream; right?</p> <p>17 And so if you -- if you attempted to use that</p> <p>18 maximum capability in both directions, 27,000 bytes of</p> <p>19 memory is not enough; right?</p> <p>20 A Right.</p> <p>21 But you would never have those two at the</p> <p>22 same time.</p> <p>23 Q Right.</p> <p>24 But if all you got was the message from</p> <p>25 LB-031 that said, "This is my maximum downstream, and</p>	<p style="text-align: right;">Page 513</p> <p>1 deployed, but before it's deployed.</p> <p>2 Q So when you design it, you put in</p> <p>3 36,000 bytes of memory.</p> <p>4 Is that -- that's the idea?</p> <p>5 A That would be one way.</p> <p>6 Q Okay. But then haven't you just eliminated</p> <p>7 any need to share memory?</p> <p>8 Because now you have the full capability for</p> <p>9 downstream, and you have the full capability of</p> <p>10 upstream. And therefore, there's no more need to</p> <p>11 share memory; right?</p> <p>12 A But then you could -- you would recognize</p> <p>13 that you could do additional services as well.</p> <p>14 Q But then we're just upping it, and we're</p> <p>15 running into further problems; right?</p> <p>16 I mean, if you want to just keep expanding</p> <p>17 it, the problem just keeps growing and growing; right?</p> <p>18 A It would depend on how it was implemented.</p> <p>19 Q Okay. And then -- and then the other thing</p> <p>20 that you've done, now you've eliminated any need to</p> <p>21 share memory, but you've also increased the amount of</p> <p>22 memory and eliminated the benefit of memory sharing;</p> <p>23 correct?</p> <p>24 A You haven't eliminated it, because you're</p> <p>25 able to support higher rate services.</p>
<p style="text-align: right;">Page 512</p> <p>1 this is my maximum upstream," and each device was</p> <p>2 allowed to use up to that amount, then isn't it true</p> <p>3 that it would require 36,000 bytes of memory, and it</p> <p>4 doesn't have that? Right?</p> <p>5 A Well, again, I'm not sure I agree with your</p> <p>6 characterization of LB-031.</p> <p>7 But it is true that, if you were to specify a</p> <p>8 total that exceeded the capacity of the -- the memory,</p> <p>9 then there will be a problem.</p> <p>10 Q Okay. But -- and then -- so your solution to</p> <p>11 that, though, is that it would be trivial to one of</p> <p>12 skill in the art to select a different size memory for</p> <p>13 the interleaver/de-interleaver pair.</p> <p>14 So is your argument there that you would then</p> <p>15 simply select 36,000 bytes of memory to put into</p> <p>16 Mazzoni?</p> <p>17 A That -- how I interpreted Dr. Cooklev's</p> <p>18 argument there -- and maybe I misinterpreted it, but I</p> <p>19 interpreted his argument as being that that total</p> <p>20 exceeds the total disclosed in Mazzoni.</p> <p>21 Q Right.</p> <p>22 And you're saying it would be trivial to</p> <p>23 simply up it to 36,000.</p> <p>24 Is that the argument?</p> <p>25 A Not when you're actually -- not after it's</p>	<p style="text-align: right;">Page 514</p> <p>1 Q But if -- but if you have higher rate</p> <p>2 services, then you're not going to -- then you're</p> <p>3 going to need more than 36,000?</p> <p>4 A But not if you -- not if the capabilities</p> <p>5 exchanged are compatible with each other.</p> <p>6 Q And the capabilities exchanged, that you're</p> <p>7 attempting to describe here, is something other than</p> <p>8 what LB-031 describes; right?</p> <p>9 A I'm not sure I agree with you on that.</p> <p>10 Q Okay. So let's -- let me try to put this to</p> <p>11 rest, though.</p> <p>12 So wasn't your argument that you -- that the</p> <p>13 trivial part that you describe on page 111, the</p> <p>14 trivial part that you're describing there is -- is</p> <p>15 simply that you would increase the amount of memory to</p> <p>16 36,000?</p> <p>17 A Well, it -- the -- the particular point I was</p> <p>18 making here is that end to end, you would need</p> <p>19 potentially more, because again, it's the interleaver</p> <p>20 in one and the de-interleaver in the other. But you</p> <p>21 would adjust the memory -- the amount of memory in one</p> <p>22 or both of them.</p> <p>23 Q By increasing it?</p> <p>24 A Yes.</p> <p>25 Q Right.</p>

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<p style="text-align: right;">Page 515</p> <p>1 And therefore, if you increase it to the</p> <p>2 point where you can support the maximum downstream and</p> <p>3 the maximum upstream at the same time, there's no</p> <p>4 longer any need to share memory. You could partition</p> <p>5 that and make dedicated de-interleaver memory and</p> <p>6 dedicated interleaver memory; correct?</p> <p>7 A You could.</p> <p>8 But Mazzoni describes partitioning it</p> <p>9 after -- after the connection is being initialized.</p> <p>10 Q Okay. I'm going to -- I'm going to come back</p> <p>11 to that as well.</p> <p>12 So you -- you seem to think that you</p> <p>13 partition it after it's initialized, although Mazzoni</p> <p>14 describes that as happening at installation. So let</p> <p>15 me mark that down as a point to go back to.</p> <p>16 But let's -- as -- as long as we've got it</p> <p>17 out here, let's talk about LB-031.</p> <p>18 So where is it that you -- you, in any of</p> <p>19 your reports, explain that LB-031 is exchanging any</p> <p>20 messages, other than the maximum supported</p> <p>21 independently in each direction?</p> <p>22 A In my reports?</p> <p>23 Q Yes.</p> <p>24 A At paragraphs 174 through 177 of my opening</p> <p>25 report.</p>	<p style="text-align: right;">Page 517</p> <p>1 A So LB-031 is saying that you exchange the</p> <p>2 inter- -- interleaver delay in terms of octets, and</p> <p>3 it's the end-to-end delay.</p> <p>4 It says that that delay in octets has to be</p> <p>5 enough to satisfy the smallest maximum delay at the</p> <p>6 highest bit rate.</p> <p>7 And then, if a -- if a transceiver uses more</p> <p>8 memory -- has more memory available, it's free to use</p> <p>9 it.</p> <p>10 And then the smaller of the two are selected</p> <p>11 in -- in both directions.</p> <p>12 So the --</p> <p>13 Q I'm sorry. I'm sorry. Let me stop you</p> <p>14 there.</p> <p>15 You said it's free to use it. I -- I think</p> <p>16 you misspoke; correct?</p> <p>17 It's -- it's free to tell the other side</p> <p>18 about it; right?</p> <p>19 A It's free to tell the other side about it,</p> <p>20 and it's free to use it.</p> <p>21 Q How so?</p> <p>22 A You can always use more memory for</p> <p>23 interleaving and de-interleaving than the minimum.</p> <p>24 Q But it's not free to use more octets of</p> <p>25 delay; correct?</p>
<p style="text-align: right;">Page 516</p> <p>1 Q And that's Exhibit 23; right?</p> <p>2 A Yes.</p> <p>3 Q I'm sorry.</p> <p>4 You said paragraphs 174 --</p> <p>5 A Right.</p> <p>6 Q -- through 177?</p> <p>7 A Sorry. Page 65.</p> <p>8 Q No, that's okay.</p> <p>9 Okay. So I'm looking at paragraph 175. 175</p> <p>10 is just a repeat of the paragraph at the bottom of</p> <p>11 page 3. I mean, it's literally a quote from the</p> <p>12 bottom of page 3 of the LB-031 reference, which says:</p> <p>13 "The VTU-0 and VTU-R would then select the</p> <p>14 smaller of the transmitter and receiver capabilities</p> <p>15 in each direction as the end-to-end capabilities."</p> <p>16 Do you see that?</p> <p>17 A Yes.</p> <p>18 Q Okay. So that's consistent with</p> <p>19 Dr. Cooklev's view of LB-031.</p> <p>20 Can you tell me where else you have described</p> <p>21 anything that is different than the -- the idea that</p> <p>22 in LB-031, it's contemplated that each device can then</p> <p>23 use independently in each direction up to the amount</p> <p>24 that they agree on as -- as the smallest capability of</p> <p>25 each device in each direction?</p>	<p style="text-align: right;">Page 518</p> <p>1 A Correct.</p> <p>2 Q Okay. So whatever amount of memory is</p> <p>3 required to implement its octets of delay, to</p> <p>4 implement its interleaver or de-interleaver, it can't</p> <p>5 use more than that; right?</p> <p>6 A It can't use more -- it can't impose more</p> <p>7 delay than that.</p> <p>8 Q Okay. So if -- and let's -- let's -- let's</p> <p>9 try to simplify the discussion. Let's -- let's talk</p> <p>10 about just a single direction. Let's talk about the</p> <p>11 downstream direction. So I'm going to try to limit my</p> <p>12 questions to the downstream direction.</p> <p>13 So if the VTU-R says that I can support up to</p> <p>14 8 kilobytes of delay downstream, and the VTU-0 says</p> <p>15 that it can support up to 12 kilobytes of delay</p> <p>16 downstream, what would they then select as the -- the</p> <p>17 amount of delay downstream that either device could</p> <p>18 choose to use?</p> <p>19 A According to LB-031, it would be the smaller.</p> <p>20 So it would be the 8 kilobytes.</p> <p>21 Q Okay. And so is there -- so given LB-031, is</p> <p>22 there any scenario under which -- again, a teaching in</p> <p>23 LB-031 that I'm going to ask you to point me to, that</p> <p>24 either device could attempt to use more than</p> <p>25 8 kilobytes of delay in the downstream direction?</p>

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<p style="text-align: right;">Page 519</p> <p>1 A No.</p> <p>2 Q Okay. So for example, the additional</p> <p>3 4 kilobytes of delay that the VTU-0 was capable of</p> <p>4 using, those will never be used in the downstream</p> <p>5 direction between those two devices; correct?</p> <p>6 A Are you talking memory or delay?</p> <p>7 Q Delay.</p> <p>8 A If the delay is set to 8 kilobytes, then</p> <p>9 that's the delay that the two ends would achieve.</p> <p>10 Q Okay. Now, let me add to that scenario. So</p> <p>11 you've got the VTU-0 saying that I can support</p> <p>12 12 kilobytes of delay downstream. The VTU-R is saying</p> <p>13 it can support up to 8 kilobytes downstream.</p> <p>14 Now, I'm going to let -- I'm going to add</p> <p>15 upstream to that. So the VTU-R -- I'm sorry -- the</p> <p>16 VTU-0 says that it can support -- just to keep this</p> <p>17 simple, it can support 8 upstream. The VTU-R says, I</p> <p>18 can support 12 kilobytes upstream.</p> <p>19 What is the max amount of delay that those</p> <p>20 devices could implement in the upstream direction,</p> <p>21 given the teaching of LB-031?</p> <p>22 A Can you repeat your numbers?</p> <p>23 Q Yes. I'm sorry. I kept downstream the same.</p> <p>24 So VTU-0 is 12 downstream. VTU-R is 8 downstream.</p> <p>25 Now upstream, VTU-0 is 8, so I'm flipping it, and</p>	<p style="text-align: right;">Page 521</p> <p>1 let me just ask the question. I don't recall exactly</p> <p>2 what you said.</p> <p>3 But -- so if you'd take a look at the bottom</p> <p>4 of column 6, the paragraph that begins at about</p> <p>5 line 21. There's a sentence that says, quote -- and</p> <p>6 the sentence begins at about line 55. It says:</p> <p>7 "When the modem is installed at the end of</p> <p>8 the line, and depending on the service actually</p> <p>9 provided by the operator, the control means MCD may</p> <p>10 retrieve the corresponding values of I, M, I prime,</p> <p>11 and M prime from the stored table."</p> <p>12 Do you see that?</p> <p>13 A I do.</p> <p>14 Q So do you have an understanding anything,</p> <p>15 other than that, at the time of installation, one of</p> <p>16 the 12 services is then selected and paired with a</p> <p>17 modem at the central office side that is also</p> <p>18 configured for that service?</p> <p>19 A I don't understand the -- I don't understand</p> <p>20 this to be disclosing that the -- that one of the</p> <p>21 12 services is selected at installation and never</p> <p>22 changed.</p> <p>23 Q Okay. And what disclosure of Mazzoni do you</p> <p>24 rely on for that?</p> <p>25 A Well, in describing the partitioning of the</p>
<p style="text-align: right;">Page 520</p> <p>1 VTU-R is 12 upstream.</p> <p>2 A Okay.</p> <p>3 Q What -- what is the maximum number of bytes</p> <p>4 of delay that those devices could implement upstream,</p> <p>5 given the messaging scheme of LB-031?</p> <p>6 A 8 kilobytes.</p> <p>7 Q Okay. So for example, they couldn't decide</p> <p>8 that they're going to all of a sudden use 12 kilobytes</p> <p>9 upstream because the VTU-0 is going to borrow the 4</p> <p>10 that it didn't use downstream, and add it to the</p> <p>11 upstream path; right?</p> <p>12 A Well, I would expect that, if the VTU-0 could</p> <p>13 do that, it would -- it would have indicated a larger</p> <p>14 number for upstream.</p> <p>15 Q Okay. But then we're back in the Mazzoni</p> <p>16 problem; right?</p> <p>17 Because if it -- because if it -- it only has</p> <p>18 a total of 20 kilobytes of memory, and it says -- it</p> <p>19 says 12 downstream and 12 upstream, then we've got a</p> <p>20 problem; don't we?</p> <p>21 A Yes.</p> <p>22 Q Okay. So let's go back to the Mazzoni</p> <p>23 reference.</p> <p>24 A (Witness complies.)</p> <p>25 Q So you -- you had said something about -- and</p>	<p style="text-align: right;">Page 522</p> <p>1 memory between the interleaver and the de-interleaver</p> <p>2 at the bottom of column 5, it talks about an</p> <p>3 asymmetrical service, and it talks about the memory</p> <p>4 space is then divided into a first memory space</p> <p>5 assigned to the interleaving means, and a second</p> <p>6 memory space assigned to the de-interleaving means,</p> <p>7 which to me suggests that's happening at -- at run</p> <p>8 time.</p> <p>9 Q Okay. Let me stop you there.</p> <p>10 But at run time, couldn't it just be as</p> <p>11 simple as it's taken the I, M, I and M prime values</p> <p>12 that were retrieved for the service installed at the</p> <p>13 time of installation, and simply using them to</p> <p>14 implement the interleaver/de-interleaver?</p> <p>15 A It's possible. That would be a very</p> <p>16 restrictive -- that would be a really restrictive</p> <p>17 system.</p> <p>18 Q Okay. But again, I'm trying to understand.</p> <p>19 Given Mazzoni's disclosure -- so you've pointed out,</p> <p>20 it would be restrictive.</p> <p>21 But you haven't pointed out anything, at</p> <p>22 least not there, that necessarily means that it's</p> <p>23 doing something other than pulling I, M, I prime, and</p> <p>24 M prime, at the time of installation; right?</p> <p>25 A Well, at column 4, line 15, it refers to</p>

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1 installing the device, which is then capable of
2 processing all of the different services.

3 Q Okay. Right.

4 So you can install a de- -- you can -- you
5 can create a device; right?

6 So you create your Mazzoni CPE device, and it
7 has 27,000K of memory to support the various services.

8 But then you take that box to the customer's home, and
9 through some sort of interface to the device, you say,
10 This guy gets the A3 service. It's installed.

11 A3 service is up and running.

12 Is that inconsistent with anything you just
13 read there?

14 A Well, it's somewhat inconsistent with the
15 last sentence of that paragraph, which says the
16 parameters of the memory space of that memory may need
17 to be set in accordance with the service actually
18 processed by the device.

19 Q Okay. So the A3 service is actually being
20 processed by that device; right?

21 In that scenario, where I've installed the
22 box, and I've set the A3 service, so then the memory
23 space was set in accordance with the service actually
24 processed by the device; right?

25 A That would be one very limiting way to deploy

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1 VDSL service.

2 Q Well, in fact, I think your comment about
3 Mazzoni overall is that it is limiting; right?

4 A It has a number of aspects that are limiting.
5 It's -- it's got a lot of flexibility in some ways,
6 but for example, that table is limiting.

7 Q Okay. So one of the -- one of the things
8 that, you know, someone may view as a downside of
9 Mazzoni, which is that he has 12 pre-configured
10 services. Someone else may view that as a benefit,
11 though; right?

12 A I don't know. I don't know how people would
13 necessarily view it. It's -- it's possible.

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<p style="text-align: right;">Page 527</p> <div style="background-color: black; width: 100%; height: 40px; margin-bottom: 10px;"></div> <p>5 Q Okay. So I think we've agreed that the I and</p> <p>6 M and I prime and M prime parameters are not</p> <p>7 exchanged -- well, let me go more basic than that.</p> <p>8 Mazzoni itself does not describe any</p> <p>9 messaging scheme, for initialization or otherwise, to</p> <p>10 set up any of its transmission parameters; correct?</p> <p>11 A It does not appear to contemplate things like</p> <p>12 initialization.</p> <p>13 Q Okay. So earlier, when we were talking about</p> <p>14 the amount of memory that Mazzoni calculates for use</p> <p>15 by its interleaver and de-interleaver -- let me ask</p> <p>16 you more directly.</p> <p>17 So do you have an opinion, one way or the</p> <p>18 other, whether Mazzoni's bit rates, that are provided</p> <p>19 for each service, are actually variable, as opposed to</p> <p>20 being precisely the bit rate that the service is</p> <p>21 indicated for?</p> <p>22 A I'm not sure I understand your question.</p> <p>23 Q Okay. So let me -- so let me -- let me use</p> <p>24 an example here.</p> <p>25 So let's take a look at the -- let's talk</p>	<p style="text-align: right;">Page 529</p> <p>1 both of those paths are present, which he, I believe,</p> <p>2 contemplates.</p> <p>3 No. I'm thinking of a different reference.</p> <p>4 So yes, that would be my understanding, is</p> <p>5 that that would be the line rate.</p> <p>6 Q Okay. So the -- so 362 times 64 kilobits per</p> <p>7 second is -- is precisely the line rate that will be</p> <p>8 delivered with the S6 service; correct?</p> <p>9 A I don't have any reason to think that's not</p> <p>10 correct.</p> <p>11 Q Okay. And there's no -- there's no</p> <p>12 negotiation where you might arrive at a lower bit rate</p> <p>13 or a higher bit rate; correct?</p> <p>14 A Disclosed explicitly in here?</p> <p>15 Q Correct.</p> <p>16 A I don't see anything.</p> <p>17 Q So there's no disclosure that, depending on</p> <p>18 the bit rate, that theoretically it might achieve</p> <p>19 that's something different than this number, we're</p> <p>20 then going to go off and adjust our I and M; right?</p> <p>21 A Well, if the -- I think that the way that a</p> <p>22 person having ordinary skill would read this would be,</p> <p>23 if you signed up for or were allocated the S6 service,</p> <p>24 and the line conditions were such that it couldn't be</p> <p>25 supported, maybe it would drop back to S5, as an</p>
<p style="text-align: right;">Page 528</p> <p>1 about the -- so at the top of column 4 of Mazzoni, in</p> <p>2 line 1, there's -- this is picking up in the middle of</p> <p>3 the sentence. It says:</p> <p>4 "In the fastest symmetrical service, S6 has a</p> <p>5 bit rate of 362 times 64 kilobits per second."</p> <p>6 Do you see that?</p> <p>7 A I do.</p> <p>8 Q Okay. So when Mazzoni provides the S6</p> <p>9 service, is it your understanding that it will be</p> <p>10 providing exactly 362 times 64 kilobits per second?</p> <p>11 A It's not clear to me whether that's the line</p> <p>12 data rate or the user data rate.</p> <p>13 Q But if it's being used to determine the size</p> <p>14 of an interleaver/de-interleaver memory, wouldn't you</p> <p>15 conclude that it's the line data rate?</p> <p>16 A Yes, I would.</p> <p>17 Q Okay. Because after all, bits and bytes to</p> <p>18 an interleaver and de-interleaver, they don't</p> <p>19 distinguish between user data and other sorts of</p> <p>20 overhead, for example; right?</p> <p>21 A Right.</p> <p>22 But -- but let me actually revise my answer.</p> <p>23 This -- it's not clear that that's the -- the</p> <p>24 bit rate of the interleaved path or fast and</p> <p>25 interleaved, assuming that they're -- that they --</p>	<p style="text-align: right;">Page 530</p> <p>1 example.</p> <p>2 Q And if it dropped back to S5, it would then</p> <p>3 pull the I and M again out of the table that it</p> <p>4 stores; right?</p> <p>5 A That's correct.</p> <p>6 Q Okay. But that fallback operation is not</p> <p>7 disclosed in any of them; right?</p> <p>8 A It's not explicitly disclosed. I think it's</p> <p>9 clear that it -- it -- it would be possible.</p> <p>10 Q Do you know how many -- we were talking about</p> <p>11 the AT&T service profiles. Do you know how many</p> <p>12 single line VDSL2 service profiles AT&T provides?</p> <p>13 A I don't know. I'd have to look at the</p> <p>14 document.</p> <p>15 MR. MCANDREWS: Okay. It seems like a good</p> <p>16 time for a break.</p> <p>17 THE VIDEOGRAPHER: Going off the record. The</p> <p>18 time is now 12:28.</p> <p>19 (Lunch break taken at 12:28 p.m.)</p> <p>20 ---oOo---</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

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<p style="text-align: right;">Page 531</p> <p>1 AFTERNOON SESSION</p> <p>2 1:36 P.M.</p> <p>3</p> <p>4</p> <p>5</p> <p>6 THE VIDEOGRAPHER: Going on the record. The</p> <p>7 time is now 1:36.</p> <p>8 MR. MCANDREWS: This morning, we briefly</p> <p>9 talked about your preparation for the deposition and</p> <p>10 the materials that you considered in preparing for the</p> <p>11 deposition and in preparing your reports.</p> <p>12 Q Is it correct that you did not talk to -- is</p> <p>13 it Dr. Walker?</p> <p>14 A I don't know --</p> <p>15 Q Okay.</p> <p>16 A -- actually.</p> <p>17 Q I'll call him Dr. Walker.</p> <p>18 So -- so Dr. Walker -- is it true that you</p> <p>19 did not speak to him in preparing for your deposition</p> <p>20 today?</p> <p>21 A I -- I -- I met him yesterday for the first</p> <p>22 time, but it was in passing, and I didn't talk to him</p> <p>23 about my -- I did -- I didn't -- it was social</p> <p>24 introductions. Nice to meet you.</p> <p>25 And I don't -- I talked to him once in the</p>	<p style="text-align: right;">Page 533</p> <p>1 report, like, final and signed?</p> <p>2 A I think so.</p> <p>3 Q Do you know whether it was his first report</p> <p>4 on the issue of infringement for Family 3?</p> <p>5 First of all, let me ask you: Was it on the</p> <p>6 issue of Family 3 infringement?</p> <p>7 A Yes, I believe so.</p> <p>8 Q Okay. Was there a single report, or were</p> <p>9 there multiple?</p> <p>10 A I -- I saw a report a while back, and then I</p> <p>11 saw, I believe, a final version of another report</p> <p>12 either Monday or yesterday.</p> <p>13 Q You're saying "another report."</p> <p>14 A second report?</p> <p>15 A I think it was a second report. It was the</p> <p>16 final version, as far as I understand.</p> <p>17 Q The final version of a second report of</p> <p>18 Dr. Walker?</p> <p>19 A I think so. I didn't -- I didn't compare it</p> <p>20 to the first report that I saw, or the -- what I had</p> <p>21 reviewed before.</p> <p>22 Q Did you intend to supplement your expert</p> <p>23 report on Family 3 infringement, based on what you saw</p> <p>24 in the last couple of days?</p> <p>25 A No.</p>
<p style="text-align: right;">Page 532</p> <p>1 course of preparing my reports, but I don't remember</p> <p>2 which family it was connected with.</p> <p>3 Q Okay. But since the time that you submitted</p> <p>4 your last report for Family 3, have you spoken to</p> <p>5 Dr. Walker substantively about anything relating to</p> <p>6 Family 3?</p> <p>7 A I have not spoken to him about anything</p> <p>8 directly related to Family 3.</p> <p>9 Q Okay. Have you received any additional</p> <p>10 written materials from Dr. Walker relating to</p> <p>11 Family 3 since that time?</p> <p>12 A Just his reports.</p> <p>13 Q Just the reports that you understand to have</p> <p>14 been submitted on the same dates as your reports?</p> <p>15 A That's my understanding. I don't know how</p> <p>16 many reports he submitted. I believe that I saw all</p> <p>17 of them.</p> <p>18 Q Okay. So for example, if there was a report</p> <p>19 regarding Family 3 that was first, I guess, issued</p> <p>20 today and provided to us today, have you seen that</p> <p>21 report?</p> <p>22 A I don't know the dates of the reports that</p> <p>23 I've seen. I did review a report of Dr. Walker's</p> <p>24 Monday or yesterday. I don't remember.</p> <p>25 Q And did you understand it to be a complete</p>	<p style="text-align: right;">Page 534</p> <p>1 Q Do any of your opinions today, your</p> <p>2 testimony, rely on that report?</p> <p>3 A No.</p> <p>4 Q Did you spend any time reading that report?</p> <p>5 A I read it either Monday or -- I think Monday</p> <p>6 I read it.</p> <p>7 Q And you understood it to be in final form on</p> <p>8 Monday?</p> <p>9 A Yes.</p> <p>10 Q Was that a topic of discussion with your</p> <p>11 attorneys on Monday?</p> <p>12 A I don't think we discussed it, no.</p> <p>13 Q Where did you get it from?</p> <p>14 A From Goodwin.</p> <p>15 Q You got it during the course of the meeting</p> <p>16 on Monday?</p> <p>17 A I believe I got it after the meeting.</p> <p>18 Q And what were you told about what that</p> <p>19 document was?</p> <p>20 A I believe the e-mail said it was a final</p> <p>21 version of the report.</p> <p>22 Q And you were asked to read it?</p> <p>23 A No. It was for information.</p> <p>24 Q Okay. Did you have an understanding that</p> <p>25 that document would be provided to our law firm?</p>


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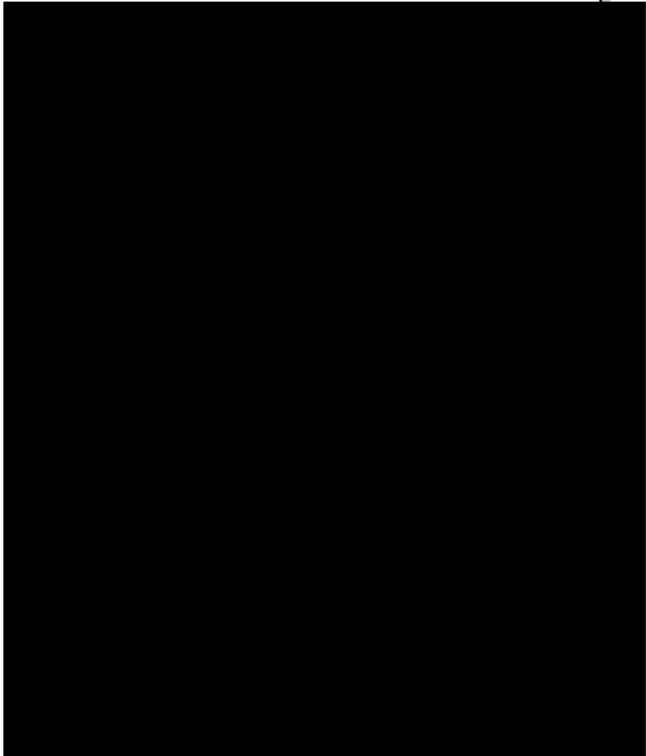
1 **A** I assume so. I -- I don't -- I -- I didn't
2 **think about that.**
3 **Q** If it was final on Monday, do you know why it
4 wasn't provided to us until today?
5 **A** I don't know.
6 **Q** Do you have an understanding that there was a
7 second Walker report related to Family 2?
8 **A** I don't know. I don't have any recollection
9 of that.
10 **Q** Did you re- -- on Monday, did you review any
11 Family 2 reports of Walker?
12 **A** I don't believe so.
13 **Q** Did you review any Family 2 reports of Walker
14 in preparing for your Family 2 deposition?
15 **A** I don't -- I -- I -- I did. His -- I believe
16 his rebuttal report to Dr. Almeroth.
17 **Q** Okay. And did you understand there to be a
18 second report of Dr. Walker directed to Family 2
19 infringement?
20 **A** I am not aware of that.
21 **Q** And so, if you've seen one, you don't recall
22 having seen one?
23 **A** That's correct. I don't recall having seen
24 more than one Family 2 report.
25 **Q** Okay. And can you recall what issues the

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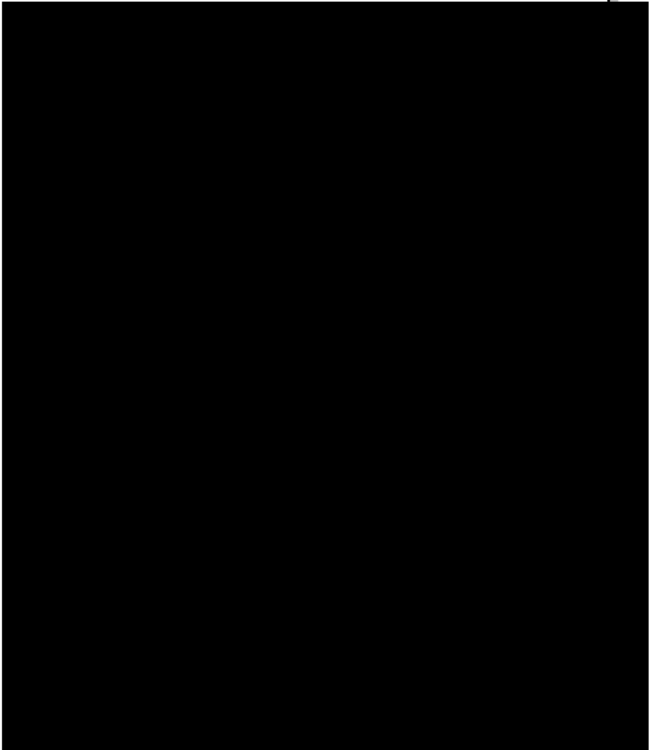
1 Family 3 report -- the new Family 3 report of
2 Dr. Walker addresses?
3 **A** I believe he was responding to Dr. Almeroth's
4 reply.
5 **Q** Okay. And is there any information in that
6 report that's relevant to your testimony today?
7 **A** It's relevant in that it addresses
8 Dr. Almeroth's infringement position.
9 **Q** Okay. Is there anything in particular about
10 his infringement position that you recall being
11 addressed in the Walker report?
12 **A** I don't remember anything in particular.



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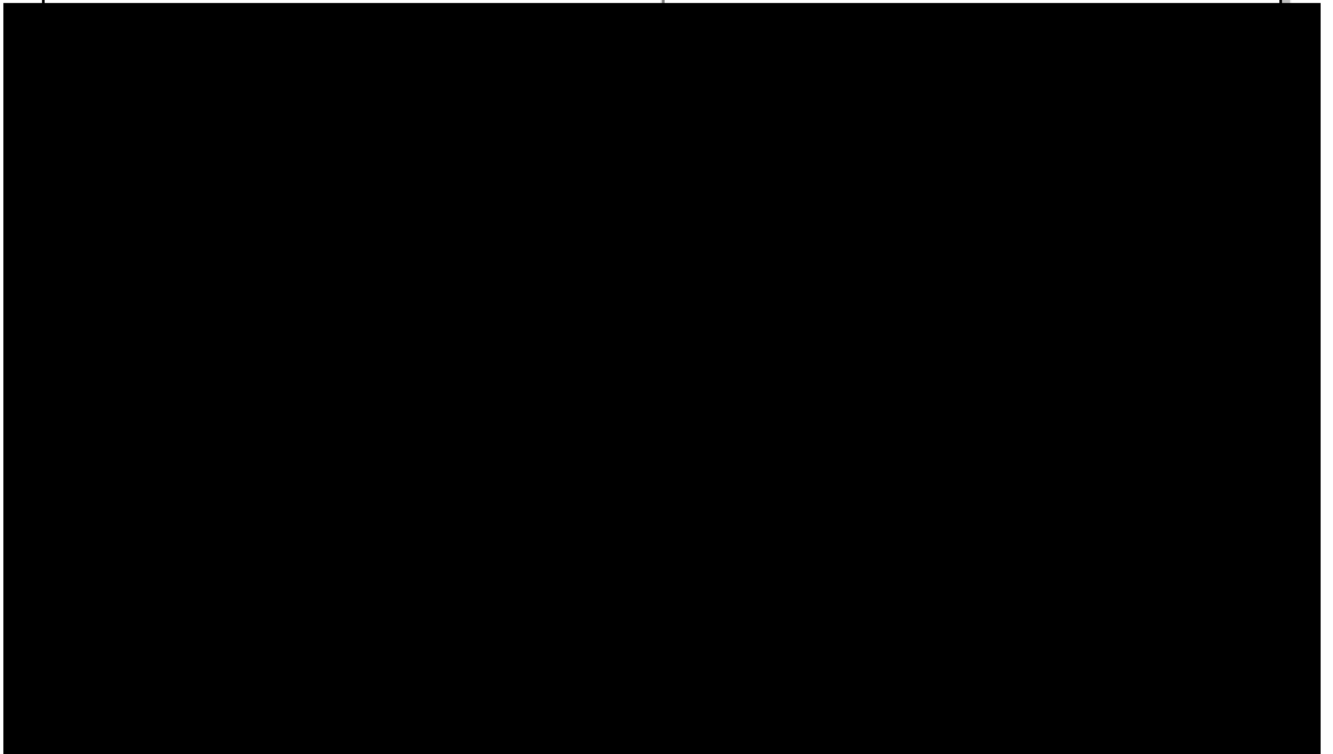


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4 Q Okay. And so we just talked about the shared
5 memory element of the claim. I want to talk about an
6 element that shows up only in the '473 patent of
7 Family 3.

8 And again, if you could refer back to
9 page 55. It's in front of you there.

10 A (Witness complies.)

11 Q And it's -- one, two, three, four, five --
12 it's the sixth term down in the left-hand column. It
13 says:

14 "Wherein at least a portion of the memory may
15 be allocated to the interleaving function or the
16 de-interleaving function at any one time, depending on
17 the message."

18 And I -- I truncated there. I know that
19 there is more language at issue. But I think that
20 language actually shows up in a patent that's not at
21 stake in the 2Wire case. So I was reading that
22 without some of the stuff in brackets.

23 So let me just state it again. The language
24 is:

25 "Wherein at least a portion of the memory may

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<p style="text-align: right;">Page 547</p> <p>1 be allocated to the interleaving function or the</p> <p>2 de-interleaving function at any one particular time,</p> <p>3 depending on the message."</p> <p>4 Do you see that?</p> <p>5 A I do.</p> <p>6 Q And so let me break that down. Let -- let --</p> <p>7 let me leave out the "depending on the message" part,</p> <p>8 for starters.</p> <p>9 A Okay.</p> <p>10 Q So what we just described, where the --</p> <p>11 the -- the last memory location for an interleaver is</p> <p>12 then followed one position later by the first location</p> <p>13 for the de-interleaver, and that boundary can move,</p> <p>14 depending on the size of the interleaver, would you</p> <p>15 agree with me that that meets the language of this</p> <p>16 claim element, setting aside for the moment the</p> <p>17 "depending on the message"?</p> <p>18 A Well, the -- the -- the words "may be</p> <p>19 allocated" would certainly seem to cover that type of</p> <p>20 scenario.</p> <p>21 Q Okay. And if -- and if the message includes</p> <p>22 I and D values, so for example, if the message</p> <p>23 includes the I value and the D value for the</p> <p>24 interleaver -- for the upstream interleaver, for</p> <p>25 example, in the Accused Products, then whether a</p>	<p style="text-align: right;">Page 549</p> <div style="background-color: black; width: 100%; height: 150px; margin-bottom: 10px;"></div> <p>16 Q So could you -- I think you still have</p> <p>17 Exhibit 29 in front of you. It's the LB-031</p> <p>18 reference.</p> <p>19 A (Witness complies.)</p> <p>20 Q So do you understand that Dr. Cooklev's</p> <p>21 position is that the LB-031 disclosure is</p> <p>22 inconsistent?</p> <p>23 In other words, it could not be used with a</p> <p>24 device that implements shared memory?</p> <p>25 A I understand that to be his position.</p>
<p style="text-align: right;">Page 548</p> <p>1 portion of the memory is allocated to the interleaver</p> <p>2 or de-interleaver, would depend on the message; isn't</p> <p>3 that right?</p> <p>4 A Did you say the amount allocated would depend</p> <p>5 on the values or on the message?</p> <p>6 Q No.</p> <p>7 The -- I said whether a particular byte of</p> <p>8 memory is used -- I'm sorry -- whether a particular</p> <p>9 byte of memory is allocated to the interleaver</p> <p>10 function, or to the de-interleaver function would</p> <p>11 depend on the I and D provided in the OPMS message; is</p> <p>12 that right?</p> <p>13 A Well, I think it would depend on how it was</p> <p>14 implemented.</p> <p>15 Q But assuming that all of the memory that was</p> <p>16 allocated to the interleaving function was in the</p> <p>17 memory addresses that come first, and then all of the</p> <p>18 memory that is allocated to the de-interleaver</p> <p>19 function starts one byte later, then whether a</p> <p>20 particular portion of the memory is allocated to the</p> <p>21 interleaver function, or the de-interleaver function,</p> <p>22 would depend on the message; right?</p> <p>23 A It would depend on the values of I and D for</p> <p>24 the interleaver and the -- for the de-interleaver, and</p> <p>25 again, also on the implementation.</p>	<p style="text-align: right;">Page 550</p> <p>1 Q Do you disagree with that?</p> <p>2 A I do.</p> <p>3 Q Okay.</p> <p>4 A Yes.</p> <p>5 Q Okay. So you disagree with that. Might come</p> <p>6 back to that in a moment.</p> <p>7 But let me ask you this: Do you believe that</p> <p>8 the LB-031 reference discloses the use of shared</p> <p>9 memory?</p> <p>10 A I believe that I stated in my reports that I</p> <p>11 don't think it's explicitly disclosed, but that a</p> <p>12 person having ordinary skill in the art would</p> <p>13 recognize that the disclosures could be used with a</p> <p>14 shared memory approach.</p> <p>15 Q Okay. So your -- your position is that it</p> <p>16 could be used.</p> <p>17 But given the disclosure of LB-031, is it</p> <p>18 necessarily the case that it could only be used with a</p> <p>19 device that implements shared memory?</p> <p>20 A I don't think the disclosure of LB-031 is</p> <p>21 limited to use with a shared memory.</p> <p>22 Q Okay. So I'm going to give you a couple of</p> <p>23 other exhibits here, so...</p> <p>24 (Document marked Exhibit 30</p> <p>25 for identification.)</p>

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<p style="text-align: right;">Page 551</p> <p>1 MR. MCANDREWS: We've marked as Exhibit 30</p> <p>2 ITU G.993.1.</p> <p>3 (Document marked Exhibit 31</p> <p>4 for identification.)</p> <p>5 MR. MCANDREWS: We've marked as Exhibit 31</p> <p>6 ITU G.992.2.</p> <p>7 (Document marked Exhibit 32</p> <p>8 for identification.)</p> <p>9 MR. MCANDREWS: Exhibit 32 is U.S. Patent</p> <p>10 No. 5,751,741, naming as the first inventor Voith.</p> <p>11 (Document marked Exhibit 33</p> <p>12 for identification.)</p> <p>13 MR. MCANDREWS: And Exhibit 33 is U.S. Patent</p> <p>14 No. 6,707,822, naming Fadavi-Ardekani as the first</p> <p>15 named inventor. And that's F-A-D-A-V-I, hyphen,</p> <p>16 A-R-D-E-K-A-N-I.</p> <p>17 Q So I'm -- I'm going to ask you a similar</p> <p>18 question to what I just asked you. So I'm going to go</p> <p>19 down the list here.</p> <p>20 So the 993.1 ITU specification -- first of</p> <p>21 all, do you recognize Exhibit 30?</p> <p>22 A I do.</p> <p>23 Q And Exhibit 30 is -- is the ITU G.993.1</p> <p>24 standard or recommendation that you rely on as prior</p> <p>25 art, with respect to the Family 3 patents; is that</p>	<p style="text-align: right;">Page 553</p> <p>1 A That's correct.</p> <p>2 Q Okay. Does G.992.2 disclose shared memory?</p> <p>3 A Well, similarly to 993.1, the use of shared</p> <p>4 memory are not -- is an implementation decision, and</p> <p>5 is not something that a standard would necessarily</p> <p>6 specify.</p> <p>7 So it -- similarly to G.993.1, my opinion is</p> <p>8 that it doesn't exclude the use of shared memory, but</p> <p>9 it -- it -- yeah, it doesn't exclude the use of shared</p> <p>10 memory.</p> <p>11 Q Okay. But you would agree, that the</p> <p>12 disclosure in 992.2 is consistent as well with the</p> <p>13 possible use of dedicated memory, where a certain</p> <p>14 amount of memory is dedicated only to an interleaver,</p> <p>15 and a certain amount of memory is dedicated only to a</p> <p>16 de-interleaver?</p> <p>17 A It does not describe or mandate any</p> <p>18 particular implementation, whether using dedicated</p> <p>19 memories or shared memory.</p> <p>20 Q So it could be used with dedicated memories?</p> <p>21 A It could be used with dedicated or shared.</p> <p>22 Q Okay. Now, I want you to take a look at the</p> <p>23 Voith reference that you have in front of you there,</p> <p>24 Exhibit 32.</p> <p>25 A (Witness complies.)</p>
<p style="text-align: right;">Page 552</p> <p>1 right?</p> <p>2 A It appears to be, yes.</p> <p>3 Q Okay. G.993.1, do you believe that that</p> <p>4 discloses the use of shared memory?</p> <p>5 A I don't believe it discloses it explicitly,</p> <p>6 but I don't believe it -- it would preclude the use of</p> <p>7 shared memory.</p> <p>8 Q Okay. So is it fair to say that it -- it</p> <p>9 doesn't require the use of shared memory, but it's</p> <p>10 your view that it could be used with shared memory?</p> <p>11 A It would not require the use of shared</p> <p>12 memory, but could be used with shared memory.</p> <p>13 Q Okay. And it could also be used with a</p> <p>14 device that has memory dedicated to an interleaver,</p> <p>15 and separate memory dedicated to a de-interleaver?</p> <p>16 A That's right.</p> <p>17 Q Okay. Exhibit 31, that you have in front of</p> <p>18 you there, is ITU-T G.992.2. I believe that sometimes</p> <p>19 that is referred to as the G.Lite standard; is that</p> <p>20 correct?</p> <p>21 A That's right.</p> <p>22 Q Okay. And Exhibit 31 is one of the prior art</p> <p>23 references that you rely on for your invalidity</p> <p>24 opinions, with respect to at least some of the Family</p> <p>25 3 patents; is that right?</p>	<p style="text-align: right;">Page 554</p> <p>1 Q And this -- so the Voith reference, that's</p> <p>2 one of the references you rely on as prior art for</p> <p>3 your invalidity positions, with respect to some of the</p> <p>4 Family 3 patents?</p> <p>5 A That's correct.</p> <p>6 Q Okay. When did you first learn about the</p> <p>7 Voith reference?</p> <p>8 A During the course of this litigation.</p> <p>9 Q Okay. Do you know either of the three named</p> <p>10 inventors?</p> <p>11 A Not to my knowledge.</p> <p>12 Q Okay. Do you recognize them as -- as</p> <p>13 individuals that participated in any DSL standards</p> <p>14 meetings?</p> <p>15 A I -- I don't recognize them specifically in</p> <p>16 that way. Motorola definitely participated, but I</p> <p>17 don't remember any of those three names as people that</p> <p>18 I ran across.</p> <p>19 Q Okay. So let's take a look at, for example,</p> <p>20 Figure 2 of the Voith reference.</p> <p>21 A (Witness complies.)</p> <p>22 Q And Figure 2 illustrates a box labeled 66</p> <p>23 that says "External Interleave/Deinterleave Memory."</p> <p>24 Do you see that?</p> <p>25 A I do.</p>

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<p style="text-align: right;">Page 555</p> <p>1 Q Is it your position that the Voith reference</p> <p>2 discloses shared memory in the way it was dis- --</p> <p>3 construed by the Court?</p> <p>4 A I believe that a person having ordinary skill</p> <p>5 would recognize that memory could be shared memory as</p> <p>6 construed by the Court.</p> <p>7 Q So it could be.</p> <p>8 But is it also consistent with the Voith</p> <p>9 disclosure that the interleave/de-interleaver memory</p> <p>10 block 66 could include separate dedicated memory</p> <p>11 spaces for the interleaver and de-interleaver?</p> <p>12 A It could be either dedicated or shared.</p> <p>13 Q And the Voith reference itself doesn't</p> <p>14 explicitly describe whether it is dedicated or shared;</p> <p>15 right?</p> <p>16 A It does not say one way or the other.</p> <p>17 Q Okay. And the -- the last of the exhibits</p> <p>18 I've put in front of you there, Exhibit 33, which is</p> <p>19 U.S. Patent 6,707,822, first named inventor</p> <p>20 Fadavi-Ardekani.</p> <p>21 If I refer to this as the Fadavi reference,</p> <p>22 would you understand that to be the '822 patent?</p> <p>23 A Yes.</p> <p>24 Q And the Fadavi reference is one of the items</p> <p>25 of prior art that you rely on in your invalidity</p>	<p style="text-align: right;">Page 557</p> <p>1 G.992.1?</p> <p>2 But I want to try to use the language he uses</p> <p>3 in this section, just to keep everything straight</p> <p>4 here; is that okay?</p> <p>5 A Sure.</p> <p>6 He could also be referring to T1.413 Issue 1</p> <p>7 or Issue 2.</p> <p>8 But I know what you mean when you say</p> <p>9 standard ADSL versus G.Lite.</p> <p>10 Q Okay. So if we have -- so is it your</p> <p>11 understanding, of this disclosure, that the same --</p> <p>12 Well, let me ask you this: So do you</p> <p>13 understand what he means by an IDIM -- what Fadavi</p> <p>14 means by an IDIM?</p> <p>15 A Yes.</p> <p>16 Q And what does that mean?</p> <p>17 A It's the acronym he uses for the</p> <p>18 interleave/de-interleave memory.</p> <p>19 Q Okay. So is your understanding of this</p> <p>20 section of Fadavi -- your understanding is that it's</p> <p>21 describing a single IDIM for a single device that can</p> <p>22 support both G.Lite and standard ADSL?</p> <p>23 A Potentially.</p> <p>24 He's first and foremost describing a device</p> <p>25 for deployment in the central office, that can support</p>
<p style="text-align: right;">Page 556</p> <p>1 opinions, with respect to the Family 3 patents?</p> <p>2 A That's correct.</p> <p>3 Q Okay. Do you believe that Fadavi-Ardekani</p> <p>4 discloses shared memory?</p> <p>5 A I do.</p> <p>6 Q Can you tell me which aspects of Fadavi</p> <p>7 necessarily indicate that shared memory is being used?</p> <p>8 A If you look at column 7, for example, he</p> <p>9 calculates the amount of memory that would be required</p> <p>10 for four G.Lite sessions running simultaneously.</p> <p>11 He then relates that to a full rate ADSL</p> <p>12 line, and I believe he uses the maximum interleave</p> <p>13 depth and block size in that calculation.</p> <p>14 And then he discusses using that same amount</p> <p>15 of memory to support additional ADSL sessions, as long</p> <p>16 as the interleave depth is lower.</p> <p>17 Q Okay. So let's -- let's break that down.</p> <p>18 So when you -- when you say "full rate ADSL,"</p> <p>19 are you referring to 992.1?</p> <p>20 A At this state, yes.</p> <p>21 Q Okay. So -- and does Fadavi actually use</p> <p>22 full rate, or is he referencing that as standard ADSL?</p> <p>23 A Right. He refers to it as standard ADSL.</p> <p>24 Q Okay. So is it okay that -- that when I say</p> <p>25 "standard ADSL," I know that we're talking about</p>	<p style="text-align: right;">Page 558</p> <p>1 multiple DSL sessions all at the same time.</p> <p>2 Q Okay. So -- so are you saying that it's not</p> <p>3 clear whether he is proposing a single device with a</p> <p>4 single IDIM to support one or -- to support both in</p> <p>5 the same device?</p> <p>6 A I don't think it excludes that.</p> <p>7 Q Okay. So why don't we -- so why don't we --</p> <p>8 since -- do you have an opinion on whether it does or</p> <p>9 it does not disclose that you're going to do all this</p> <p>10 in the same device?</p> <p>11 A I think he discloses a very flexible device</p> <p>12 that could be used in multiple ways, all standard --</p> <p>13 what he called standard ADSL.</p> <p>14 Is that what he calls it?</p> <p>15 Q Uh-huh.</p> <p>16 A Versus G.Lite. He -- he talks about having</p> <p>17 resources shared among different links, basically.</p> <p>18 Q Okay. So why don't we do it this way. Why</p> <p>19 don't we -- let's first talk about a G.Lite only</p> <p>20 version. Then we'll talk about a standard ADSL only</p> <p>21 version. And then -- and then we can talk about a</p> <p>22 device that is capable of doing both.</p> <p>23 A Okay.</p> <p>24 Q So we cover it all; okay?</p> <p>25 So let's talk about a device -- and this is a</p>

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<p style="text-align: right;">Page 559</p> <p>1 CO device that can implement -- I guess that can</p> <p>2 support four G.Lite sessions.</p> <p>3 So can you tell me how much total</p> <p>4 interleaver/de-interleaver memory would be required to</p> <p>5 support four G.Lite sessions?</p> <p>6 A Well, according to the patent, each</p> <p>7 interleaver requires 4 kilobytes.</p> <p>8 You said four; right?</p> <p>9 Q Yes.</p> <p>10 A So that's 16 kilobytes for de-interleaving.</p> <p>11 Well, actually, if it's in the CO, it's the</p> <p>12 interleaver, but -- and then for upstream direction,</p> <p>13 2 kilobytes per session, so that's another eight.</p> <p>14 So he concludes that it's 24 kilobytes of RAM</p> <p>15 for the four G.Lite sessions.</p> <p>16 Q Okay. So -- and is there -- is the fast path</p> <p>17 used in G.Lite?</p> <p>18 A Yes. My recollect- -- I would -- I -- I</p> <p>19 could look to see whether it's mandatory or optional,</p> <p>20 but there -- there can be.</p> <p>21 Q So I don't know if this is what he's</p> <p>22 referring to. But on -- on about line 17, he says:</p> <p>23 "A fast path buffer is also required for fast</p> <p>24 path data in both the interleave and de-interleave</p> <p>25 processes, and requires 256 bytes of RAM per session,</p>	<p style="text-align: right;">Page 561</p> <p>1 (Recess taken.)</p> <p>2 THE VIDEOGRAPHER: Going on the record.</p> <p>3 This marks the beginning of Videotape No. 3,</p> <p>4 Volume III, in the deposition of Dr. Krista Jacobsen.</p> <p>5 The time is now 2:36.</p> <p>6 MR. MCANDREWS: Okay.</p> <p>7 Q Before the break, we were talking about</p> <p>8 G.Lite, and the memory requirements for implementing</p> <p>9 four sessions, and whether -- there was a question</p> <p>10 about whether G.Lite used a fast path and, therefore,</p> <p>11 needed to set aside a portion of the memory for fast</p> <p>12 path. And you were going to take a look at 992.2.</p> <p>13 What did you conclude?</p> <p>14 A I concluded, there is only one latency path.</p> <p>15 So it -- it's the interleaved path. So I would</p> <p>16 conclude there is no need for this additional fast</p> <p>17 path buffer in G.Lite.</p> <p>18 Q Okay. So -- and that's actually consistent</p> <p>19 with Fadavi at line -- starting at about line 12,</p> <p>20 where it says:</p> <p>21 "Therefore, 24 kilobytes of RAM is required</p> <p>22 to support four G.Lite sessions."</p> <p>23 Do you see that?</p> <p>24 A I do see that.</p> <p>25 Q Okay. So using only the G.Lite example, is</p>
<p style="text-align: right;">Page 560</p> <p>1 or a total of 1 K bytes for four sessions."</p> <p>2 Is that referencing a G.Lite, or is that the</p> <p>3 standard ADSL?</p> <p>4 A Well, it's definitely T1.413 Issue 1, because</p> <p>5 there, you had to have fast and interleaved. Even if</p> <p>6 you didn't necessarily have fast or interleaved data,</p> <p>7 you had to have both paths.</p> <p>8 Optionally, in 992.1 and T1.413 Issue 2, you</p> <p>9 could have two paths. So it would apply to that.</p> <p>10 And I would have to look to see if -- if</p> <p>11 there were -- if dual latency was supported in 992.2.</p> <p>12 Do you want me to look?</p> <p>13 Q Okay. Yeah, you can -- you can look.</p> <p>14 I -- actually, now that I read this, I think</p> <p>15 that might have been referring only to the standard</p> <p>16 ADSL.</p> <p>17 But why don't you look. Let's just...</p> <p>18 A (Witness reading document.)</p> <p>19 MR. MCANDREWS: We're going to go off the</p> <p>20 record briefly while you read so we can change the</p> <p>21 disc. But you please go ahead and keep reading.</p> <p>22 THE VIDEOGRAPHER: This marks the end of</p> <p>23 Videotape No. 2, Volume III, in the deposition of</p> <p>24 Dr. Krista Jacobsen.</p> <p>25 The time is now 2:27. Going off the record.</p>	<p style="text-align: right;">Page 562</p> <p>1 it your position that the G.Lite example necessarily</p> <p>2 discloses the use of shared memory?</p> <p>3 A I think it could use shared memory or another</p> <p>4 implementation.</p> <p>5 Q So it could use shared memory, or it could</p> <p>6 use dedicated memory; correct?</p> <p>7 A That would be another way to do it.</p> <p>8 Q Okay. So -- so four sessions, for example,</p> <p>9 implemented in a CO device, could have 16 kilobytes of</p> <p>10 downstream interleaver memory and 8 kilobytes of</p> <p>11 upstream de-interleaver memory, where the interleaver</p> <p>12 memory was only ever used for interleaving, and the</p> <p>13 de-interleaver memory was only ever used for</p> <p>14 de-interleaving; is that right?</p> <p>15 A It could. It could also -- it could also</p> <p>16 support, for example, fewer sessions than that where,</p> <p>17 potentially, a portion of the memory would be used for</p> <p>18 downstream in one configuration and upstream in the</p> <p>19 other.</p> <p>20 Q Well, so let's -- let's explore that. So</p> <p>21 let's say, for example -- and I don't know if this is</p> <p>22 even possible. Let's just say hypothetically, you</p> <p>23 wanted to use that same amount of memory and support</p> <p>24 only two sessions; right?</p> <p>25 A Okay.</p>

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<p style="text-align: right;">Page 563</p> <p>1 Q And you wanted to double your interleaver and</p> <p>2 de-interleaver depth for each session.</p> <p>3 A Okay.</p> <p>4 Q Does G -- G.Lite even allow that?</p> <p>5 A During the sessions?</p> <p>6 Q No. At a different time.</p> <p>7 A G.Lite describes different interleaver depth</p> <p>8 values that are possible.</p> <p>9 Q So -- so just to be clear, though, the -- the</p> <p>10 amounts that we just talked about there, those are the</p> <p>11 maximum that are necessary; right?</p> <p>12 A I believe so. At least according to</p> <p>13 Fadavi-Ardekani, a simple implementation requires</p> <p>14 4 kilobytes for downstream and 2 kilobytes for</p> <p>15 upstream.</p> <p>16 Q Okay. Well, let's just say theoretically</p> <p>17 that you could -- whether G.Lite is capable of doing</p> <p>18 it or not, let's say that you could -- instead of</p> <p>19 doing four G.Lite sessions, you decided to do</p> <p>20 two G.Lite sessions, and to double the size of your</p> <p>21 interleaver memory and double the size of your</p> <p>22 de-interleaver memory per session.</p> <p>23 A Okay.</p> <p>24 Q Okay. So -- and take the -- the dedicated</p> <p>25 example that I just described, where you've got</p>	<p style="text-align: right;">Page 565</p> <p>1 de-interleaving. You could do it that way.</p> <p>2 You could also, on a per-session basis, say,</p> <p>3 I need 6 kilobytes for downstream, 2 kilobytes for</p> <p>4 upstream. That would be another way.</p> <p>5 And then, when you changed the number of</p> <p>6 sessions, that would change where the memory was</p> <p>7 allocated for downstream and upstream.</p> <p>8 Q Okay. So -- so is that what you intended in</p> <p>9 your report when you -- when you -- you mentioned the</p> <p>10 sessions, and it wasn't clear to us what you meant by</p> <p>11 the sessions having anything to do with sharing.</p> <p>12 But is that what you intended --</p> <p>13 A That --</p> <p>14 Q -- in your report?</p> <p>15 A -- that's what I thought I said.</p> <p>16 Q Okay. I mean, you didn't -- you didn't</p> <p>17 provide any sort of illustration that showed how this</p> <p>18 would be divided up; did you?</p> <p>19 A No, I don't think I did.</p> <p>20 Q Okay. So let's go with that, though.</p> <p>21 So -- so you -- you intended to say that</p> <p>22 it -- that it -- that it could be divided up such</p> <p>23 that -- I guess you put session one -- everything you</p> <p>24 need for session one interleaver and de-interleaver in</p> <p>25 one spot. And then you put interleaver and</p>
<p style="text-align: right;">Page 564</p> <p>1 16 kilobytes of memory that are always used for the</p> <p>2 downstream interleaver, and 8 kilobytes that are</p> <p>3 always used for the upstream de-interleaver.</p> <p>4 So if you want to support two sessions rather</p> <p>5 than four, and double the size of your memories, isn't</p> <p>6 it possible that you would then just split up the 16</p> <p>7 between the two sessions?</p> <p>8 And so you have -- you have 8 kilobytes for</p> <p>9 session one downstream. You have 4 kilobytes for</p> <p>10 session one upstream. And then you have 8 kilobytes</p> <p>11 for session two downstream -- I'm sorry -- yeah,</p> <p>12 session two downstream, and 4 kilobytes for session</p> <p>13 two upstream.</p> <p>14 A That would be one way to do it.</p> <p>15 Q Okay. And Fadavi doesn't indicate that it</p> <p>16 would be done other than that way; correct?</p> <p>17 A Well, it doesn't say it would be done that</p> <p>18 way, either.</p> <p>19 I think a person reading -- a person having</p> <p>20 ordinary skill reading this, would understand if you</p> <p>21 had the four sessions, in -- in your example, you</p> <p>22 could lump all of the sessions -- well, you could</p> <p>23 arrange it in a number of ways.</p> <p>24 But you could say the first 16 kilobytes are</p> <p>25 for interleaving, and the last 8 kilobytes are for</p>	<p style="text-align: right;">Page 566</p> <p>1 de-interleaver in another spot, and so on.</p> <p>2 And then, when you make those memories larger</p> <p>3 because you're going to support a larger memory for</p> <p>4 fewer sessions, there would be some that -- there</p> <p>5 would be some memory portions that would be used by</p> <p>6 one thing at one time and another thing at a different</p> <p>7 time.</p> <p>8 Is that what you were saying?</p> <p>9 A That is it.</p> <p>10 Q Okay. But that's not necessarily the case;</p> <p>11 right?</p> <p>12 A It -- it doesn't explicitly say how it's</p> <p>13 done.</p> <p>14 The -- the point that I was making is, that</p> <p>15 you would understand reading this, that that would be</p> <p>16 one way to do it. The way that you mentioned might</p> <p>17 also be a way you could do it. It would be an</p> <p>18 implementation choice.</p> <p>19 Q And the particular implementation choice is</p> <p>20 not disclosed in Fadavi; correct?</p> <p>21 A I don't believe Fadavi describes where,</p> <p>22 within this IDIM, the interleaving part is taking</p> <p>23 place and the de-interleaving part is taking place.</p> <p>24 He describes that the -- the two portions are</p> <p>25 disjoint, but not how, from session to session, the</p>

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<p style="text-align: right;">Page 567</p> <p>1 different sessions are supported within that IDIM.</p> <p>2 Q Okay. So -- so you would agree with me that</p> <p>3 Fadavi does not necessarily disclose shared memory?</p> <p>4 A It doesn't disclose any particular</p> <p>5 implementation. My position is that it would be</p> <p>6 recognized as being implementable either in shared</p> <p>7 memory or dedicated memory.</p> <p>8 Q Okay. And I don't know if it's worth going</p> <p>9 through the standard ADSL version of this.</p> <p>10 But do you think we would arrive at the same</p> <p>11 place, where you would agree with me that it does not</p> <p>12 necessarily require the use of shared memory to</p> <p>13 implement four standard ADSL sessions?</p> <p>14 A It does not exclude that approach, but it</p> <p>15 does not explicitly require any particular</p> <p>16 implementation.</p> <p>17 Q Okay. So for example, would you agree with</p> <p>18 me that this is describing a total memory requirement</p> <p>19 of 76 kilobytes for four standard ADSL sessions?</p> <p>20 And this is beginning at about line 22 of</p> <p>21 column 7 of Fadavi.</p> <p>22 A I see that it does conclude that it would</p> <p>23 require 76 kilobytes for four standard ADSL sessions.</p> <p>24 Q Okay. And then after that, it says in</p> <p>25 parentheses:</p>	<p style="text-align: right;">Page 569</p> <p>1 memory location after that.</p> <p>2 In other words, not necessarily pooling all</p> <p>3 of the interleave memory together and all of the</p> <p>4 de-interleave memory together. You could do it either</p> <p>5 way.</p> <p>6 Q Okay. I need to ask that again, because I</p> <p>7 think you may have misspoke. I said -- I said, and</p> <p>8 that would not be inconsistent with Fadavi's</p> <p>9 disclosure; correct?</p> <p>10 And you said it would not be consistent.</p> <p>11 So let me -- let me rephrase the question.</p> <p>12 Let me start over here.</p> <p>13 So the -- the version of the division of</p> <p>14 memory that I went through, where you have 64 K of</p> <p>15 dedicated interleave memory, that you divide up</p> <p>16 amongst the four sessions, 8 K of dedicated</p> <p>17 de-interleaver memory that you divide up amongst the</p> <p>18 four sessions, and 4 K of fast path dedicated, that</p> <p>19 you divide up amongst the four sessions, that would</p> <p>20 not be inconsistent with Fadavi's disclosure; correct?</p> <p>21 A Well, it depends on how you're using</p> <p>22 "dedicated," because it's all in the same buffer.</p> <p>23 Are you saying dedicated means there is an</p> <p>24 immovable boundary between the part that's used for</p> <p>25 interleaving and the part that's used for</p>
<p style="text-align: right;">Page 568</p> <p>1 "64 K interleave plus 8 K de-interleave plus</p> <p>2 4 K fast path."</p> <p>3 Do you see that?</p> <p>4 A I do.</p> <p>5 Q Okay. So if I -- if I set up my block where</p> <p>6 I've got -- I've got 64 K consecutive memory addresses</p> <p>7 of interleave, so that's for the downstream, I've got</p> <p>8 8 K consecutive for the de-interleave upstream, and</p> <p>9 then I've got 4 K for the fast path, I could divide</p> <p>10 the 64 K up into four sessions for four separate</p> <p>11 downstream interleavers; right?</p> <p>12 A You could.</p> <p>13 Q And I could divide up the 8 K into</p> <p>14 four sessions of 2 K de-interleavers; right?</p> <p>15 A You could.</p> <p>16 Q And I could divide up the 4 K of fast path</p> <p>17 into 1 K for each session; right?</p> <p>18 A That would be one -- one way to do it.</p> <p>19 Q Okay. And that would not be inconsistent</p> <p>20 with Fadavi's disclosure; correct?</p> <p>21 A It would not be consistent.</p> <p>22 But in my opinion, it would be more</p> <p>23 cumbersome than simply doing what we talked about</p> <p>24 earlier, where interleave addresses from 0 to some</p> <p>25 number, and then de-interleave for that session one</p>	<p style="text-align: right;">Page 570</p> <p>1 de-interleaving?</p> <p>2 Q Yes.</p> <p>3 A Okay. That would be one way to implement</p> <p>4 this disclosure.</p> <p>5 And then the other -- another way would be,</p> <p>6 instead of doing that, you would set aside interleave</p> <p>7 memory for one session and de-interleave memory for</p> <p>8 that same session, and then do the same for the</p> <p>9 additional sessions.</p> <p>10 Q Okay. And I think your earlier answer that I</p> <p>11 wanted to clear up included a statement that, the way</p> <p>12 I described, would be more cumbersome; right?</p> <p>13 A In my opinion.</p> <p>14 Q Okay. Is that found anywhere in your written</p> <p>15 expert reports that it would be more cumbersome?</p> <p>16 A No. It's based on my understanding of</p> <p>17 Mazzoni, that we talked about earlier.</p> <p>18 Q You don't describe any combination of Fadavi</p> <p>19 and Mazzoni; do you?</p> <p>20 A No.</p> <p>21 But Mazzoni describes how shared memory can</p> <p>22 be allocated. He has his equations, where he talks</p> <p>23 about allocating a portion for interleaving, and then</p> <p>24 the portion right after that for de-interleaving.</p> <p>25 Q Okay. And I'll go back to that, because I --</p>

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<p style="text-align: right;">Page 571</p> <p>1 I think I heard you say that earlier, and I forgot to</p> <p>2 go back to it.</p> <p>3 But let me -- let me stick to Fadavi, because</p> <p>4 I believe that your opening expert report relies on</p> <p>5 Fadavi as disclosing shared memory.</p> <p>6 A Yes.</p> <p>7 Q Okay. But you would agree with me, that</p> <p>8 Fadavi's disclosure does not necessarily -- well,</p> <p>9 first of all, it doesn't explicitly disclose shared</p> <p>10 memory; correct?</p> <p>11 A It doesn't explicitly disclose any particular</p> <p>12 memory implementation.</p> <p>13 Q Right.</p> <p>14 So it doesn't explicitly disclose shared</p> <p>15 memory; right?</p> <p>16 A Or dedicated.</p> <p>17 Q So it doesn't explicitly disclose shared</p> <p>18 memory; correct?</p> <p>19 A It doesn't explicitly disclose dedicated or</p> <p>20 shared memory.</p> <p>21 Q Okay. So we talked about the issue of</p> <p>22 sessions and supporting four of them.</p> <p>23 Fadavi has this other implementation that he</p> <p>24 calls -- and it's beginning at line 25 of column 7.</p> <p>25 He has a separate implementation, where he calls it an</p>	<p style="text-align: right;">Page 573</p> <p>1 But I'm just going to ask you this question</p> <p>2 in general: So what do you understand Fadavi's</p> <p>3 opti- -- optimal implementation to be disclosing?</p> <p>4 A I understand the optimal implementation to</p> <p>5 allow additional sessions of ADSL to be supported, as</p> <p>6 long as they have smaller interleaved depth.</p> <p>7 Q I'm sorry. So I think you might be mixing</p> <p>8 the two embodiments.</p> <p>9 But -- so I'm going to -- so starting at</p> <p>10 line 25, it says:</p> <p>11 "An optimal implementation of the</p> <p>12 interleaver, according to the method of the invention,</p> <p>13 utilizes the same memory for receive data and transmit</p> <p>14 data, and thus requires 20 kilobytes to support a</p> <p>15 standard ADSL session at full interleave depth (16 K</p> <p>16 interleave and de-interleave plus 4 K fast path)."</p> <p>17 Do you see that?</p> <p>18 A I do.</p> <p>19 Q Okay. So let's focus on that sentence first.</p> <p>20 So that sentence describes that you can</p> <p>21 instead use only a total of 20, in contrast to the</p> <p>22 disclosure above that, that requires 24 kilobytes for</p> <p>23 a standard ADSL session.</p> <p>24 Do you see that?</p> <p>25 A I do see that.</p>
<p style="text-align: right;">Page 572</p> <p>1 optimal implementation.</p> <p>2 Are you familiar with the optimal</p> <p>3 implementation in Fadavi?</p> <p>4 A Yes.</p> <p>5 Q Okay. Are you relying on the optimal</p> <p>6 implementation for any aspects of your opinions?</p> <p>7 A Yes. I believe I cited and quoted that in my</p> <p>8 reports.</p> <p>9 Q Okay. So do you believe that the optimal</p> <p>10 implementation necessarily discloses shared memory?</p> <p>11 A I believe that that would disclose shared</p> <p>12 memory to a person having ordinary skill in the art.</p> <p>13 Q Okay. But -- and so -- and you understand</p> <p>14 that Dr. Cooklev's opinion was that the optimal</p> <p>15 implementation described in Fadavi would be inoperable</p> <p>16 if used to implement a convolutional interleaver;</p> <p>17 correct?</p> <p>18 A I don't recall that specifically, sitting</p> <p>19 here right now.</p> <p>20 Q Okay. Well, I may find it in a minute here,</p> <p>21 but -- and feel free to look through your -- I guess</p> <p>22 it would be your reply report on the issue of</p> <p>23 validity, where you -- to the extent that you had a</p> <p>24 contrary opinion, it would be provided. So feel free</p> <p>25 to look for that, if you want.</p>	<p style="text-align: right;">Page 574</p> <p>1 Q Okay. So if you're going to use only a total</p> <p>2 of 20 kilobytes to support a standard ADSL session at</p> <p>3 full interleave depth, and 4 K of that is fast path --</p> <p>4 so can we eliminate the 4 K fast path just for a</p> <p>5 second here?</p> <p>6 A Yes.</p> <p>7 Q Okay. So you're left with 16 Kbyte total</p> <p>8 interleave and de-interleave memory, but you have to</p> <p>9 support a full interleave depth for a standard ADSL</p> <p>10 session.</p> <p>11 And you would agree with me, that that's</p> <p>12 16 kilobytes, correct, downstream?</p> <p>13 A That is what he says.</p> <p>14 Q Okay. And if he's attempting to</p> <p>15 de-interleave in the same memory, he's -- he's trying</p> <p>16 to do 2 kilobytes of, I guess, upstream</p> <p>17 de-interleaving in the same memory that he's</p> <p>18 implementing 16 K of downstream interleaver, that's</p> <p>19 not going to work; is it?</p> <p>20 A I think he's made a calculation error here,</p> <p>21 because if it's only one session, it doesn't need 4 K</p> <p>22 for the fast path. It only needs a total of</p> <p>23 1 kilobyte for four sessions. So I'm not sure what is</p> <p>24 going on with his math in that -- inside the parens.</p> <p>25 But it doesn't seem like that would be right.</p>

40 (Pages 571 to 574)

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<p style="text-align: right;">Page 575</p> <p>1 Q Okay. So let's set that off as possibly</p> <p>2 being a -- you know, one mistake of Fadavi.</p> <p>3 Let's -- let's talk about the 16 K of</p> <p>4 interleave and de-interleave memory that he's</p> <p>5 apparently going to try to share.</p> <p>6 So if he has 16 kilobytes of interleave and</p> <p>7 de-interleave memory, and he's -- and he's</p> <p>8 implementing a standard ADSL session at full</p> <p>9 interleave depth, so he's using 16 K for his</p> <p>10 downstream interleaver, he's not going to be able to</p> <p>11 also use that interleaver for his -- I'm sorry -- he's</p> <p>12 not also going to be able to use any of that 16 K for</p> <p>13 an upstream de-interleaver; right?</p> <p>14 A Right.</p> <p>15 I would agree with you, which is why I think</p> <p>16 there is a math error within those parentheses,</p> <p>17 because above, he's -- he said interleaver for</p> <p>18 standard ADSL requires 16 kilobytes for downstream and</p> <p>19 2 kilobytes for upstream. And he has somehow then</p> <p>20 lost the 2 kilobytes for upstream, and I -- it doesn't</p> <p>21 make sense.</p> <p>22 Q Okay. So if he were to have a separate</p> <p>23 2 kilobytes for upstream, then again, we're back at it</p> <p>24 doesn't necessarily disclose the use of shared memory;</p> <p>25 right?</p>	<p style="text-align: right;">Page 577</p> <p>1 interleave session, or that, you know, this is going</p> <p>2 to be divided up amongst interleave sessions.</p> <p>3 We already talked about that, with respect to</p> <p>4 the, I guess, nonoptimal embodiments disclosed above</p> <p>5 line 25 of column 7; right?</p> <p>6 A I think we did, yes.</p> <p>7 Q Okay. And we talked about how that doesn't</p> <p>8 necessarily disclose shared memory; right?</p> <p>9 A Doesn't exclude it. Doesn't necessarily</p> <p>10 exclude any particular implementation.</p> <p>11 Q Okay. Then, when I asked you about the</p> <p>12 optimal implementation, you originally started -- I</p> <p>13 believe you started to talk about that -- that same</p> <p>14 concept of -- of dividing an amount of memory amongst</p> <p>15 sessions, depending on how many sessions you had;</p> <p>16 right?</p> <p>17 A Right.</p> <p>18 Q Okay. So do you -- did you have a separate</p> <p>19 theory, based on this optimal implementation that</p> <p>20 we've already -- I mean, you've recognized one</p> <p>21 potential error, and we've pointed out another</p> <p>22 potential error.</p> <p>23 But does your -- does your opinion rely on</p> <p>24 the sentence that begins on line 25 and ends on</p> <p>25 line 30?</p>
<p style="text-align: right;">Page 576</p> <p>1 A It doesn't exclude the use of shared memory.</p> <p>2 I understood this optimal implementation to be</p> <p>3 allowing use of the -- the same memory as -- as he</p> <p>4 discloses. It's just shown as one</p> <p>5 interleaver/de-interleaver RAM.</p> <p>6 Q Okay. Right.</p> <p>7 But -- so when I asked you about the optimal</p> <p>8 implementation, the way you originally described it to</p> <p>9 me is, you went to the sentence that begins with:</p> <p>10 "With a lesser interleave depth, additional</p> <p>11 sessions may be supported with the same size buffer.</p> <p>12 With a larger buffer, additional sessions may be</p> <p>13 supported."</p> <p>14 Right?</p> <p>15 A Right.</p> <p>16 Q But we already talked about that, with</p> <p>17 respect to the embodiments that are disclosed above,</p> <p>18 approximately line 25 in column 7; right?</p> <p>19 A Which line?</p> <p>20 Q Approximately line 25.</p> <p>21 So -- so -- so the last two sentences that</p> <p>22 talk about sharing between sessions, potentially;</p> <p>23 right?</p> <p>24 A Right.</p> <p>25 Q Where you -- where you might say, this is an</p>	<p style="text-align: right;">Page 578</p> <p>1 A Well, he hasn't explained how he derived the</p> <p>2 required sizes of the interleave -- interleaver and</p> <p>3 de-interleaver memory portions. He hasn't explained</p> <p>4 what the maximum value of I and the maximum value of D</p> <p>5 would be.</p> <p>6 So the way I interpreted that calculation is,</p> <p>7 he just assumed a convolutional interleaver with no</p> <p>8 particular implementation.</p> <p>9 And then the optimal implementation would</p> <p>10 have a more memory-efficient implementation, such as</p> <p>11 the triangular approach that we talked about earlier.</p> <p>12 Q Okay. But if he has a -- so are you</p> <p>13 suggesting, for example, his 16 K full interleave</p> <p>14 depth in a nonoptimal implementation is not doing</p> <p>15 triangular interleaving and requires 16 K?</p> <p>16 And then you're suggesting that maybe he's</p> <p>17 decided to use now a triangular one, so he's going to</p> <p>18 only need 8 K for a full interleave depth standard</p> <p>19 ADSL session?</p> <p>20 A Well, he doesn't explain how he's computed</p> <p>21 these values, or what kind of implementation he's</p> <p>22 done. But there is a -- an implication in that last</p> <p>23 part of that paragraph that something has changed to</p> <p>24 make it a more optimal implementation.</p> <p>25 Q Okay. If you could go to your reply expert</p>

41 (Pages 575 to 578)

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<p style="text-align: right;">Page 579</p> <p>1 report. And that is exhibit -- what exhibit is that?</p> <p>2 A 24.</p> <p>3 Q Okay. Exhibit 24.</p> <p>4 And you could -- if you could go to, for</p> <p>5 example, page 85.</p> <p>6 A (Witness complies.)</p> <p>7 Q And in paragraph 265, you state that:</p> <p>8 "Dr. Cooklev asserts that the optimal</p> <p>9 implementation described by Fadavi-Ardekani would be</p> <p>10 inoperable with G.993.1."</p> <p>11 Citing Cooklev report at paragraph 298.</p> <p>12 "Without any citation to Fadavi-Ardekani,</p> <p>13 Dr. Cooklev argues that, 'Fadavi discloses that the</p> <p>14 same memory is used for receive and transmit data</p> <p>15 alternately, and that the receive interleave data will</p> <p>16 be overwritten with interleave data that must be</p> <p>17 interleaved and transmitted."</p> <p>18 Do you see that?</p> <p>19 A I do.</p> <p>20 Q You respond by saying:</p> <p>21 "Dr. Cooklev has mischaracterized the</p> <p>22 disclosure of Fadavi-Ardekani. The portions of</p> <p>23 Fadavi-Ardekani, to which he appears to refer, concern</p> <p>24 the use of the frame buffer, not the</p> <p>25 interleave/de-interleave memory (IDIM), which is a</p>	<p style="text-align: right;">Page 581</p> <p>1 Fadavi-Ardekani posed for the nonoptimal</p> <p>2 implementation.</p> <p>3 And I think that a person, having ordinary</p> <p>4 skill in the art, would interpret that as disclosing</p> <p>5 the use of shared memory.</p> <p>6 Q Okay. But if it uses the same memory for</p> <p>7 receive data and transmit data, in other words, uses</p> <p>8 the same memory for an interleaver and a</p> <p>9 de-interleaver, and it implements a session at full</p> <p>10 interleave depth, is that possible to use the same</p> <p>11 memory for interleaving and de-interleaving?</p> <p>12 A That's what Fadavi-Ardekani says.</p> <p>13 Q That's what he says.</p> <p>14 But you, as an expert with skill in the art,</p> <p>15 as you purport to be, do you think that maybe he's</p> <p>16 wrong, and he hasn't thought through that you can't</p> <p>17 implement an interleaver and a de-interleaver where</p> <p>18 you're overwriting the interleave data bytes with</p> <p>19 de-interleave data bytes?</p> <p>20 A But it doesn't say that you're overwriting</p> <p>21 the data bytes.</p> <p>22 Q Okay. If I were to tell you -- I came to</p> <p>23 you. I want to design my own modem. And I said, I'm</p> <p>24 going to put together a device that has -- and I'm</p> <p>25 going to rely on your expertise. I'm going to say,</p>
<p style="text-align: right;">Page 580</p> <p>1 separate memory."</p> <p>2 Do you see that?</p> <p>3 A I do.</p> <p>4 Q So what frame buffer are you talking about?</p> <p>5 A If you look at column 8 of Fadavi-Ardekani.</p> <p>6 And -- and again, Dr. Cooklev did not cite</p> <p>7 anything in Fadavi-Ardekani, so I had to go hunting.</p> <p>8 But the only place I saw in Fadavi-Ardekani,</p> <p>9 that talks about data being overwritten, is at the top</p> <p>10 of column 8 in the context of the frame buffer, which</p> <p>11 is a different memory than the</p> <p>12 interleave/de-interleave memory.</p> <p>13 Q Okay. So -- so it appears that you and</p> <p>14 Dr. Cooklev may have talked past each other on this</p> <p>15 particular point.</p> <p>16 A Okay.</p> <p>17 Q So let me try to clear it up here. That's</p> <p>18 what I'm attempting to do here. So I -- I -- so let</p> <p>19 me go back to the -- the basic question.</p> <p>20 Are you relying on the sentence that begins</p> <p>21 at 25 of column 7 and runs through line 30 of column 7</p> <p>22 as disclosing shared memory as construed by the Court?</p> <p>23 A Well, that sentence, as written, suggests</p> <p>24 that there is an opt- -- optimal implementation in</p> <p>25 which less than the sum of the amounts that</p>	<p style="text-align: right;">Page 582</p> <p>1 I'm going to put together a device that -- with only</p> <p>2 16 K of memory. And I want to be able to do an</p> <p>3 interleaver that requires 16 K of memory, and a</p> <p>4 de-interleaver that requires 2 K of memory, and I want</p> <p>5 to be able to use those maximum depths of -- the</p> <p>6 depths at the same time.</p> <p>7 Would you tell me I'm crazy?</p> <p>8 Would you tell me I can't do that?</p> <p>9 A You said I -- that you only want 16 K of</p> <p>10 memory, but you need 20?</p> <p>11 Q I -- I get -- well, I was excluding fast path</p> <p>12 for the moment.</p> <p>13 But let's say that I -- that I'm only worried</p> <p>14 about doing an interleaver and a de-interleaver.</p> <p>15 A Okay.</p> <p>16 Q And I want to do convolutional interleaving</p> <p>17 with simultaneous downstream communication and</p> <p>18 upstream communication.</p> <p>19 A Okay.</p> <p>20 Q And I want -- I need -- and I -- and my</p> <p>21 implementation is going to require 2 K of upstream</p> <p>22 memory and 16 K of downstream memory. And I tell you</p> <p>23 I'm going to do that all in the same 16 K memory.</p> <p>24 What would you advise me?</p> <p>25 A I would advise you that you'd need to change</p>

42 (Pages 579 to 582)

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<p style="text-align: right;">Page 583</p> <p>1 your implementation.</p> <p>2 Q Okay. So I agree with you, if Fadavi doesn't</p> <p>3 say it's broken.</p> <p>4 But does that necessarily mean it's not</p> <p>5 broken?</p> <p>6 A It doesn't necessarily mean one or the other.</p> <p>7 He -- he does repeat that. If it's a mistake, he</p> <p>8 repeats it, because he says 20 kilobytes, and then the</p> <p>9 amount adds up to 20 kilobytes.</p> <p>10 Q Right.</p> <p>11 And he's going to -- and he's intending to</p> <p>12 support standard ADSL at full interleave depth.</p> <p>13 And you agree with me that -- that standard</p> <p>14 A -- A -- standard ADSL, at full interleave depth,</p> <p>15 requires 16 K of interleave memory; right?</p> <p>16 A Well, that's what Fadavi-Ardekani says.</p> <p>17 Q Okay. And standard ADSL at full</p> <p>18 de-interleave depth, I guess we're talking about</p> <p>19 the -- the CO equipment, requires 2 kilobytes; right?</p> <p>20 A That's what he says.</p> <p>21 Q Okay. So if I'm going to try to implement</p> <p>22 both of those at the same time in only 16 K of</p> <p>23 interleave/de-interleave memory, is that possible?</p> <p>24 A Yes, assuming that, in calculating the</p> <p>25 16 kilobytes and the 2 kilobytes, you just assumed</p>	<p style="text-align: right;">Page 585</p> <p>1 maximum interleave depth end to end in G.992.1?</p> <p>2 A I don't know that off the top of my head.</p> <p>3 Q Do you know whether Fadavi contemplated a</p> <p>4 triangular interleaver or some other implementation?</p> <p>5 A I don't know. It was 2000. Triangular</p> <p>6 approaches were definitely known by then.</p> <p>7 Q Okay. So you've inserted in here some --</p> <p>8 some uncertainty over what his implementation is.</p> <p>9 But let's -- let's go back to what Fadavi</p> <p>10 actually says. So Fadavi says he wants to use the</p> <p>11 same memory for receive data and transmit data, and</p> <p>12 thus requires -- requires -- 20 kilobytes to support a</p> <p>13 standard ADSL session; right?</p> <p>14 A I see that.</p> <p>15 Q So he's -- he's contemplating something that</p> <p>16 necessarily needs 16 K of interleave memory to</p> <p>17 implement a full ADSL session; right?</p> <p>18 A Are you talking about his parentheses?</p> <p>19 Q I'm talking about the entire sentence.</p> <p>20 He's -- he's saying what it requires.</p> <p>21 A That is what he says.</p> <p>22 Q Okay. So he's not contemplating using half</p> <p>23 of the required memory; is he?</p> <p>24 A Not explicitly, no.</p> <p>25 Q Okay. Let me ask you -- let me ask the</p>
<p style="text-align: right;">Page 584</p> <p>1 a -- an ordinary convolutional interleaver approach.</p> <p>2 And then you could have those numbers by implementing</p> <p>3 using a more efficient approach, such -- such as a</p> <p>4 triangular interleaver.</p> <p>5 Q Okay. But then -- but then, in that case,</p> <p>6 you wouldn't be using the same memory for interleaving</p> <p>7 and de-interleaving; right?</p> <p>8 A It -- I understand same memory to mean same</p> <p>9 block of memory that you can allocate to interleaving</p> <p>10 or de-interleaving, depending on what you need.</p> <p>11 Q Okay. So let's start with: Fadavi doesn't</p> <p>12 disclose that he's using a triangular interleaver;</p> <p>13 correct?</p> <p>14 A He doesn't disclose any particular</p> <p>15 implementation.</p> <p>16 Q Okay. And a standard DSL session at full</p> <p>17 interleave depth, are you saying that that is</p> <p>18 16 kilobytes of end-to-end delay?</p> <p>19 A It's -- this is given in terms of a quantity</p> <p>20 of memory. So the end-to-end delay would be twice</p> <p>21 that, at least.</p> <p>22 Q My -- my question for you is: What is --</p> <p>23 what is a -- what is a full interleave depth for</p> <p>24 standard ADSL?</p> <p>25 What is the full -- what is -- what is the</p>	<p style="text-align: right;">Page 586</p> <p>1 question this way.</p> <p>2 So set aside what standard ADSL is. Let's</p> <p>3 talk about a hypothetical DSL system, given the</p> <p>4 technologies that you're aware of, inclusive of</p> <p>5 triangular interleavers.</p> <p>6 Let's talk about a device that must support</p> <p>7 20 kilo- -- 20 kilobytes of delay downstream, and just</p> <p>8 to keep it simple, 20 kilobytes of delay upstream;</p> <p>9 okay?</p> <p>10 And so, with a triangular interleaver, I</p> <p>11 guess that would require at least 10 kilobytes of</p> <p>12 memory for upstream and 10 kilobytes of memory for</p> <p>13 downstream; right?</p> <p>14 A That's correct.</p> <p>15 Q Okay. Could I implement that device at full</p> <p>16 downstream interleave depth and full upstream</p> <p>17 de-interleave depth with only 15 kilobytes of total</p> <p>18 memory?</p> <p>19 A No.</p> <p>20 Q So there -- so there wouldn't be any way to</p> <p>21 temporarily use some of the bytes for downstream for</p> <p>22 upstream?</p> <p>23 A Not that I'm aware of.</p> <p>24 Q Okay. Certainly not with a convolutional</p> <p>25 interleaver; right?</p>

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<p style="text-align: right;">Page 587</p> <p>1 A I can't think of a way you would do it.</p> <p>2 MR. MCANDREWS: Okay. We can take a short</p> <p>3 break here.</p> <p>4 THE VIDEOGRAPHER: Going off the record. The</p> <p>5 time is now 3:21.</p> <p>6 (Recess taken.)</p> <p>7 THE VIDEOGRAPHER: Going on the record. The</p> <p>8 time is now 3:26.</p> <p>9 MR. MCANDREWS: Okay.</p> <p>10 Q Again, back to this sentence that begins on</p> <p>11 column 7 of Fadavi and runs through line 30.</p> <p>12 Is Dr. Cooklev wrong to have concluded that,</p> <p>13 if this is attempting to implement full 16 K</p> <p>14 interleaver and a 2 K de-interleaver in the same</p> <p>15 16 kilobytes of memory, it would be broken?</p> <p>16 A Well, again, it would depend on whether --</p> <p>17 are you saying whatever implementation requires 16 K</p> <p>18 of interleave memory and 2 K of de-interleave memory?</p> <p>19 Is that the hypothetical?</p> <p>20 Q Yes.</p> <p>21 A And you're trying to implement it in only</p> <p>22 16 K of memory?</p> <p>23 Q Right.</p> <p>24 Is Dr. Cooklev wrong to conclude that that's</p> <p>25 inoperable?</p>	<p style="text-align: right;">Page 589</p> <p>1 WITNESS AFFIDAVIT</p> <p>2</p> <p>3</p> <p>4</p> <p>5 _____</p> <p>6 KRISTA S JACOBSEN</p> <p>7</p> <p>8 SUBSCRIBED AND SWORN BEFORE ME</p> <p>9 THIS ____ DAY OF _____, 2019</p> <p>10 _____</p> <p>11 (Notary Public) MY COMMISSION EXPIRES ON: _____</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 588</p> <p>1 A Under that hypothetical, he would not be</p> <p>2 wrong.</p> <p>3 MR. MCANDREWS: Okay. I have no further</p> <p>4 questions at this time.</p> <p>5 MS. WALSH: Nothing from me.</p> <p>6 MR. MCANDREWS: Okay. Thank you very much.</p> <p>7 THE WITNESS: Thank you.</p> <p>8 THE VIDEOGRAPHER: This marks the end of</p> <p>9 Videotape No. 3, Volume III.</p> <p>10 This is the conclusion of today's deposition.</p> <p>11 The time is now 3:28. We are off the record.</p> <p>12 (WHEREUPON, the deposition ended</p> <p>13 at 3:28 p.m.)</p> <p>14 ---oOo---</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 590</p> <p>1 CERTIFICATE OF REPORTER</p> <p>2</p> <p>3 I, ANDREA M IGNACIO, hereby certify that the</p> <p>4 witness in the foregoing deposition was by me duly</p> <p>5 sworn to tell the truth, the whole truth, and nothing</p> <p>6 but the truth in the within-entitled cause;</p> <p>7 That said deposition was taken in shorthand</p> <p>8 by me, a disinterested person, at the time and place</p> <p>9 therein stated, and that the testimony of the said</p> <p>10 witness was thereafter reduced to typewriting, by</p> <p>11 computer, under my direction and supervision;</p> <p>12 That before completion of the deposition,</p> <p>13 review of the transcript [] was [x] was not</p> <p>14 requested If requested, any changes made by the</p> <p>15 deponent (and provided to the reporter) during the</p> <p>16 period allowed are appended hereto</p> <p>17 I further certify that I am not of counsel or</p> <p>18 attorney for either or any of the parties to the said</p> <p>19 deposition, nor in any way interested in the event of</p> <p>20 this cause, and that I am not related to any of the</p> <p>21 parties thereto</p> <p>22 Dated: _____</p> <p>23 _____</p> <p>24 ANDREA M IGNACIO, RPR, CRR, CCRR, CLR, CSR No 9830</p> <p>25</p>

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