

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

08:44:27

- - - - -

COMCAST CABLE)
COMMUNICATIONS, LLC,)
Case IPR 2024-00431
Petitioner,)
vs.) Patent No. 7,295,518
ENTROPIC COMMUNICATIONS,)
LLC,)
Patent Owner.)

DEPOSITION OF JAMES BERTONIS
Wednesday, October 30, 2024, 9:06 a.m.

Banner Witcoff
1100 13th Street, NW
Washington, DC

Reported By: Marjorie Peters, FAPR, RMR, CRR, RSA
Job Number: Veritext 6945808

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ENTROPIC EXHIBIT 2002
Comcast v. Entropic
IPR2024-00431

1 VIDEO RECORDED DEPOSITION OF JAMES BERTONIS,
2 a witness herein, called by the Patent Owner for
3 examination, taken pursuant to the Notice, by and
4 before Marjorie Peters, a Registered Merit Reporter,
5 Certified Realtime Reporter and Notary Public in and
6 for the District of Columbia, at Banner Witcoff,
7 1100 13th Street, NW, Washington, DC, on Wednesday,
8 October 30, 2024, at 9:06 a.m.

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A P P E A R A N C E S

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All exhibits were premarked and retained by counsel.	

P R O C E E D I N G S

JAMES BERTONIS,

having been called as a witness, was legally placed
under oath, testified as follows:

09:06:43

EXAMINATION

09:06:43

BY MR. HALVERSON:

09:06:43

Q. Can you please state your name.

09:06:43

A. James Bertonis.

09:06:46

Q. Can you spell the last name for the
record.

09:06:49

09:06:50

A. B-E-R-T-O-N-I-S.

09:06:51

Q. Mr. Bertonis, have you been deposed
before?

09:06:58

09:07:02

A. I have.

09:07:03

Q. Approximately how many times?

09:07:04

A. It's going to be approximate.

09:07:05

I'll say six.

09:07:12

Q. And -- sorry.

09:07:13

A. That's just a guess.

09:07:16

Q. Have those been in connection with
patent matters?

09:07:19

09:07:23

A. Some patent matters, some trademarks and

09:07:24

1 confidential information as well. Trying to think 09:07:29
2 if there's anything else. I'm not sure offhand, but 09:07:36
3 primarily patents and intellectual property. 09:07:40

4 Q. When was the last time you were deposed? 09:07:43

5 A. Well, not in the last few years. I 09:07:46
6 would say -- can I refer to my bio, and then maybe 09:07:48
7 that will -- I can find -- 09:07:48

8 Q. Sure. 09:07:48

9 A. -- maybe what I think is the last one. 09:08:01

10 Q. Sure. 09:08:04

11 A. Okay. We're not talking about, like, 09:08:16
12 court testimony, testifying at a trial? 09:08:20

13 Q. Not yet. 09:08:22

14 A. Okay. 09:08:23

15 I believe -- you know, I'm just 09:08:43
16 looking through my cases to try and recall when I 09:08:45
17 actually sat down for a deposition because some were 09:08:47
18 settled, some -- I believe it may have been Huff 09:08:50
19 versus Andrew in 2005. 09:08:58

20 There were court cases where, you 09:09:00
21 know, I was under oath at a trial, but in a 09:09:04
22 deposition similar to this, I think that would be 09:09:09

1 the last one. 09:09:13

2 Q. So I'm not sure what happened in 2005 09:09:14

3 because it was quite a while ago, so we'll run 09:09:18

4 through a couple of ground rules for today's 09:09:21

5 deposition. 09:09:22

6 A. Sure. 09:09:23

7 Q. If you could do your best to wait for me 09:09:23

8 to finish answering my question before you try to -- 09:09:29

9 or if you could do your best to wait for me to 09:09:31

10 finish asking my question before you try to answer 09:09:35

11 it so that we don't talk over each other, and I will 09:09:37

12 do my best to not jump in with my next question 09:09:40

13 until you have finished your answer. 09:09:43

14 Is that fair? 09:09:44

15 A. Yes. 09:09:45

16 Q. It's not meant to be a memory test, and 09:09:46

17 so I have given you your declaration, Exhibit 1002, 09:09:49

18 and -- 09:09:53

19 A. Okay. I also have a copy here with my 09:09:53

20 exhibits. 09:09:56

21 Q. Perfect. 09:09:56

22 A. Sorry, I just interrupted you. 09:09:57

1 Q. We'll get through them. I promise, 09:09:59
2 we'll be fine. 09:10:01

3 So I also see that you have got a 09:10:02
4 binder with a number of other exhibits. We'll get 09:10:05
5 through those as well. 09:10:08

6 But none of this is meant to be a 09:10:10
7 memory test, so if there's some sort of other 09:10:12
8 information that you think would be helpful, and I'm 09:10:15
9 referring you to one document and you'd like to look 09:10:18
10 at another one, by all means go ahead and look at 09:10:21
11 whatever you think will help you answer the 09:10:24
12 question. All right? 09:10:26

13 A. Okay. 09:10:27

14 Q. I will do my best to take a break about 09:10:27
15 every hour or so. 09:10:29

16 If you need a break before then, use 09:10:32
17 the restroom, get a glass of water, whatever, just 09:10:35
18 ask. Happy to take one, with one caveat. 09:10:39

19 If I've got a question pending, can 09:10:42
20 you agree to answer the question before we go on 09:10:44
21 that break? 09:10:45

22 A. Okay. Yes. 09:10:47

1 Q. Is there any reason why you can't give 09:10:47
2 truthful and accurate testimony today? 09:10:52

3 A. No reason. 09:10:57

4 Q. Perfect. 09:10:57

5 So you brought your declaration and 09:10:59
6 a handful of exhibits. If we could start with your 09:11:01
7 declaration, I just want to make sure it's a full 09:11:04
8 version of your declaration. 09:11:07

9 If you go to -- you can do it. If 09:11:08
10 you go to the very end, there should be a couple of 09:11:10
11 appendices back there; is that right? 09:11:15

12 A. Yes. 09:11:16

13 Q. One is your CV, one is a listing of the 09:11:16
14 claims? 09:11:20

15 A. Yes. 09:11:21

16 Q. Then if you go a few pages before that, 09:11:22
17 you should have a signature page; is that right? 09:11:26

18 A. Yes. 09:11:40

19 Q. That appears on page 114 of 09:11:40
20 Exhibit 1002? 09:11:44

21 A. Yes. 09:11:45

22 Q. That's your signature there? 09:11:45

1 A. Yes, it is. 09:11:46

2 Q. Then in the binder, I just want to make 09:11:48
3 sure you have the right patent, and we're on the 09:11:51
4 same page nomenclature-wise, can you look at the tab 09:11:53
5 that has Exhibit 1001 in it. 09:11:57

6 A. Okay. 09:12:05

7 Q. Can you read the patent number for me. 09:12:05

8 A. US Patent Number 7,295,518 B1. 09:12:07

9 Q. Is it fair for us to refer to that as 09:12:16
10 the '518 patent today? 09:12:19

11 A. Yes. 09:12:20

12 Q. Is that the patent number that matches 09:12:21
13 the patent number on the front of your declaration? 09:12:22

14 A. I believe so, but I can check. 09:12:25

15 Yes. The patent page. 09:12:31

16 Q. Perfect. 09:12:36

17 If you get too much paper, you can 09:12:36
18 set the stuff that I brought aside, and just use 09:12:39
19 yours. 09:12:42

20 A. Okay. 09:12:42

21 Q. Had you read the '518 patent before you 09:12:43
22 started your work on this case? 09:12:48

1 A. So by your question, do you mean before 09:12:59
2 I was retained to work on the case or... 09:13:02

3 Q. Sorry. Yes. 09:13:05
4 I'm not interested in anything about 09:13:06

5 the retention process or conversations you had with 09:13:07
6 counsel from Banner Witcoff in the period of time 09:13:12
7 just before they retained you. 09:13:17

8 A. Yes. 09:13:18

9 Q. I meant as far as your experience as 09:13:20
10 unrelated to this proceeding. 09:13:22

11 A. Okay. I understand now. Okay. 09:13:24

12 No, I had not. 09:13:25

13 Q. So let's spend a little bit of time in 09:13:26
14 your background. 09:13:30

15 Did you go to undergrad? 09:13:33

16 A. Yes. 09:13:37

17 Q. What did you study? 09:13:38

18 A. Electrical engineering. 09:13:40

19 Q. Where was that? 09:13:41

20 A. Syracuse University. 09:13:42

21 Q. Did you graduate? 09:13:44

22 A. I did. 09:13:46

1 Q. Did you get any further degrees? 09:13:47

2 A. I did. 09:13:50

3 Q. In what? 09:13:51

4 A. Master's in business administration 09:13:53

5 in -- centered on finance from University of Santa 09:13:59

6 Clara. 09:14:03

7 Q. Anything else? 09:14:04

8 A. Well, I could add that I -- since you 09:14:07

9 asked about graduate, I did take a graduate course 09:14:10

10 as an elective at Syracuse in communications 09:14:12

11 engineering. I believe it was 601 or 602-level 09:14:18

12 course while I was a senior. 09:14:22

13 Q. Approximately what year was that course 09:14:23

14 taken in? 09:14:29

15 A. I believe it would be my final semester, 09:14:29

16 so that would be spring of 1976. 09:14:33

17 Q. What types of things did you study in 09:14:36

18 that graduate course on communications engineering? 09:14:39

19 A. Well, it was graduate-level introduction 09:14:46

20 course that covered multiple forms of 09:14:49

21 communications. So it covered satellite, covered 09:14:53

22 various types of terrestrial communications, 09:14:59

1 microwave, cable tech -- there was a lot on cable 09:15:04
2 technology. 09:15:06

3 So it was really all forms, as we 09:15:09
4 knew back in 1976, of communications. 09:15:13

5 Q. That was -- sorry. Go ahead. 09:15:17

6 A. Well, I was going to say, I got an A, 09:15:26
7 but I'm answering a question you didn't ask, so... 09:15:33

8 Q. So are you currently employed? 09:15:38

9 A. I am. 09:15:48

10 Q. Where? 09:15:48

11 A. My company is Azure Communications 09:15:50
12 Incorporated in Los Gatos, California. 09:15:54

13 Q. What does Azure do? 09:15:57

14 A. Present time, we're an engineering 09:16:00
15 consulting company. 09:16:02

16 Q. What does that mean? 09:16:09

17 A. Well, we do design work for other 09:16:10
18 companies. We most recently designed a reference 09:16:13
19 board for a chipset. So various consulting 09:16:18
20 projects, engineering-related projects. 09:16:25

21 Q. How many people work at Azure? 09:16:27

22 A. Right now, I'm the only full-time 09:16:29

1 employee. 09:16:32

2 Q. Do you have contract employees? 09:16:32

3 A. We have over time and we've had other 09:16:34

4 full-time employees in the past. 09:16:39

5 Q. How about right now? 09:16:43

6 A. Right now, I'm the only full-time person 09:16:44

7 at the company. 09:16:46

8 Q. Are there part-time people right now? 09:16:47

9 A. One person who assists me from time to 09:16:49

10 time, and not very active. 09:16:51

11 Q. On technical matters, or clerical or 09:16:55

12 administrative-type? 09:16:59

13 A. I would say more clerical and 09:17:00

14 administrative. 09:17:02

15 And of course, I have, from time to 09:17:04

16 time, other people that help out in, you know, 09:17:06

17 accounting or legal or whatever. 09:17:09

18 Q. Are there other individuals right now 09:17:13

19 who are participating in engineering consulting work 09:17:15

20 at Azure? 09:17:19

21 A. Not at this time. 09:17:19

22 Q. When was the last time that there were? 09:17:20

1 A. Well, I don't know if it was the last 09:17:27
2 time, but we had a major project designing a 09:17:29
3 reference board, and I had a team of about ten 09:17:32
4 people working on designing the reference board and, 09:17:35
5 you know, involved design, simulation, building 09:17:45
6 printed circuit boards, testing the boards, and then 09:17:48
7 working with the manufacturing house that built the 09:17:51
8 prototypes. 09:17:56

9 So I had a fairly large staff on 09:17:56
10 that project. 09:17:58

11 Q. So your declaration describes Azure as 09:17:59
12 doing wireless broadband solutions and advanced 09:18:04
13 radio technology. 09:18:09

14 Is that a fair characterization? 09:18:10

15 A. I would say it's fair, but that's 09:18:12
16 probably just -- I haven't changed my website in ten 09:18:17
17 years, so... 09:18:20

18 Q. What is broadband? 09:18:21

19 A. I say broadband, it's a term that refers 09:18:30
20 to generally high-speed communications. 09:18:36

21 Q. Are you familiar with a term called 09:18:42
22 "narrowband"? 09:18:56

1 in mind the website is marketing. 09:20:26

2 Q. Just to be fair, this is not the 09:20:29

3 website. This is your declaration that I'm reading. 09:20:30

4 A. Ah, okay. Okay. Fair enough. Thank 09:20:33

5 you. 09:20:37

6 Q. So if you could open up your dec for me. 09:20:40

7 I'm looking at pages 2 and 3. Your employment 09:20:47

8 starts up at Paragraph 5, and then you spend a 09:20:55

9 little bit of time talking about your education, and 09:20:58

10 go on back through some of your other experiences 09:21:01

11 over the next two or three pages or so. 09:21:05

12 As I skim through this, I see 09:21:11

13 something in Paragraph 12 that refers to DOCSIS. 09:21:18

14 Do you see that? 09:21:28

15 A. Yes. 09:21:28

16 Q. What is DOCSIS? 09:21:29

17 A. DOCSIS is the cable standard for 09:21:30

18 internet over the cable television system. 09:21:34

19 Q. A couple of paragraphs before there's a 09:21:43

20 lot of discussion about wireless technologies. I'm 09:21:46

21 looking at Paragraph 10, excuse me. The last 09:21:59

22 sentence of Paragraph 10 outlines a number of 09:22:01

1 modulation formats that were used with WiFi. 09:22:04

2 Do you see that? 09:22:09

3 A. Yes. 09:22:12

4 Q. So where did you first come in contact 09:22:12
5 with WiFi as a standard? 09:22:15

6 A. You know, I can't recall. I will say 09:22:24
7 that it did come after the WiFi standard did come 09:22:27
8 after wireless LANs were adopted. I don't recall 09:22:41
9 the actual year that WiFi was adopted. It was a 09:22:45
10 different standards body than 802.11. 09:22:53

11 Q. Perhaps a broader question, when did you 09:22:57
12 first come in contact with wireless LANs? 09:23:00

13 A. At least at the time I was doing a 09:23:04
14 project for Toshiba, and I see I have that cited as 09:23:11
15 1990 to '92. That sounds correct. 09:23:18

16 Can you repeat your question? 09:23:27

17 Q. When did you first come in contact with 09:23:29
18 wireless LANs? 09:23:33

19 A. At least that period, but I believe I 09:23:34
20 may have worked on a wireless LAN project 09:23:37
21 commercially before that. I was working on a 09:23:45
22 robotic golf caddie, and amongst other things, they 09:23:49

1 needed a wireless LAN in it, and I remember 09:23:52
2 developing a LAN technology for that. 09:23:57

3 I don't recall the year, but I would 09:23:59
4 say -- at least I'm comfortable saying at least 1990 09:24:02
5 for involvement with wireless LANs. 09:24:08

6 Q. Do you know whether or not either of 09:24:12
7 those projects that you were working on for Toshiba 09:24:15
8 or the golfing industry were commercialized? 09:24:20

9 A. The golf caddie was not. The company 09:24:23
10 ran out of financing before the robotic golf caddie 09:24:26
11 was able to enter the market. There were prototypes 09:24:30
12 that were deployed at a golf club, so it was 09:24:37
13 operational. It was a very sophisticated product. 09:24:40

14 The Toshiba wireless LAN, they did 09:24:43
15 begin producing it in small numbers, but I believe 09:24:49
16 soon after that -- so this was done before a lot of 09:24:55
17 standards were adopted, and -- so I believe they 09:25:01
18 moved to a different technology and format both in 09:25:08
19 terms of the technical standard, but also the type 09:25:11
20 of module they put in their laptop changed. 09:25:15

21 They went from what they had at 09:25:24
22 Toshiba, a very proprietary module, to something 09:25:26

1 where industry -- industry adopted. At that time I 09:25:30
2 was not -- you know, my involvement with the company 09:25:38
3 was -- you know, I wasn't involved in their 09:25:40
4 subsequent wireless LAN projects after 1992. 09:25:42

5 I see I did mention golfing 09:25:50
6 industry, so that was '95, so I would say the 09:25:53
7 Toshiba was -- at least from what I can see here, my 09:25:55
8 earliest involvement with wireless LANs. 09:25:59

9 Q. Then on the DOCSIS front, was that paper 09:26:01
10 in 2000 your first exposure to DOCSIS? 09:26:07

11 A. Can I ask what I think you're asking? 09:26:18

12 Q. Sure. 09:26:21

13 A. Are you saying that in the process of 09:26:21
14 writing that paper, that was my first involvement 09:26:24
15 with DOCSIS, is that your question? 09:26:27

16 Q. That's the question, yes. 09:26:28

17 A. Yeah. The answer would be no. 09:26:30

18 Q. When was your first exposure to DOCSIS? 09:26:31

19 A. When I began plans to create a product 09:26:34
20 and a company in 1999. I began studying DOCSIS in 09:26:40
21 depth, with an eye toward developing a new wireless 09:26:48
22 cable product. So that would be sometime in 1999. 09:26:58

1 Q. Do you remember which version of DOCSIS 09:27:02
2 was governing at that time? 09:27:05

3 A. Okay. I -- this is just on 09:27:06
4 recollection. I believe that the DOCSIS that was 09:27:12
5 being used at the time was either DOCSIS 1 or DOCSIS 09:27:17
6 1.1, but soon we evolved into DOCSIS 2. 09:27:23

7 But I believe the product was using 09:27:28
8 DOCSIS -- the product that I was conceiving and the 09:27:33
9 product we ultimately developed was using 09:27:35
10 DOCSIS 1.1. 09:27:39

11 Q. Were you involved at all in the DOCSIS 09:27:39
12 standard-setting organization? 09:27:42

13 A. I wasn't a member of CableLabs, but I 09:27:46
14 followed the development of DOCSIS fairly heavily. 09:27:51

15 Q. Why? 09:27:54

16 A. Because it was important for how our 09:27:56
17 product operated to be compliant with the DOCSIS 09:27:59
18 standard that was sort of an overriding imperative 09:28:01
19 that the product needed to be fully compliant with 09:28:06
20 DOCSIS. 09:28:10

21 Q. You said that you were the -- the 09:28:11
22 product that you're referring to was a DOCSIS 2 09:28:13

1 wireless product? 09:28:18

2 A. Well, the product that we contemplated 09:28:22
3 and ultimately developed was a product that used the 09:28:24
4 DOCSIS standard to broadcast wireless internet using 09:28:27
5 DOCSIS. 09:28:33

6 So in many ways it was similar to a 09:28:33
7 cable system with just a cable with a wireless 09:28:37
8 system in the middle. 09:28:42

9 Q. Does the DOCSIS -- sorry. Better 09:28:44
10 question. Let me start over. 09:28:47

11 Did the DOCSIS standard require that 09:28:49
12 the transmissions happen over a cable at that time? 09:28:54

13 A. Well, inherent in the standard of DOCSIS 09:28:58
14 was the use of cable. Are you asking was there -- 09:29:04
15 I'm not sure what you're asking. 09:29:11

16 Q. I think you answered it. 09:29:12

17 A. Okay. 09:29:17

18 Q. What was the contemplated use of that 09:29:17
19 product? 09:29:30

20 A. So the application we had in mind was 09:29:31
21 for wireless internet to -- same people that would 09:29:38
22 use a cable modem, but instead of running cable, 09:29:47

1 there would be a wireless path, but you would still 09:29:50
2 have a cable modem ultimately that would provide 09:29:54
3 your internet with your ethernet jack. 09:29:57

4 (Clarification requested by the Court Reporter.) 09:30:10

5 A. Ethernet jack. So, in other words, 09:30:11
6 cable modem has F connecter at one end and ethernet 09:30:11
7 at the other end. 09:30:15

8 Q. Now, your declaration, I'm looking at 09:30:16
9 the end of Paragraph 12, it says that product was 09:30:18
10 purchased by all of the major cable operators. 09:30:21

11 Do you see that? 09:30:24

12 A. Yeah. That's referring to a different 09:30:24
13 product that we subsequently developed. 09:30:26

14 Q. How would you describe the differences 09:30:29
15 between the product that we were just referring to 09:30:32
16 and the product described in Paragraph 12? 09:30:35

17 A. Much different. 09:30:38

18 Q. What changed? 09:30:39

19 A. Well... 09:30:41

20 Q. Or, sorry. Let me withdraw that 09:30:44
21 question and ask a better one. 09:30:47

22 A. Yeah. That might take all day. 09:30:49

1 Q. Yeah. 09:30:51

2 So what did the second product do? 09:31:03

3 A. Okay. The second product was much 09:31:05

4 different in whereas the first product was designed 09:31:08

5 to be sold to wireless cable operators, wireless 09:31:11

6 ISPs -- I'm sorry. Well, wireless ISPs, but they 09:31:17

7 would be required to buy a cable headend which was 09:31:22

8 expensive. 09:31:25

9 So the product was successful. We 09:31:26

10 did sell it to several wireless ISPs, but CMTS is a 09:31:29

11 very expensive type of base station, and at the time 09:31:37

12 we were competing with WiFi and other proprietary 09:31:43

13 wireless internet systems. 09:31:50

14 So in the process of testing that 09:31:55

15 product, and selling it, cable companies became 09:31:57

16 aware of what we were doing, and approached us to 09:32:02

17 develop a different product. Much different in 09:32:08

18 terms of what it achieved and how it would operate. 09:32:13

19 But they came to us because we obviously knew and 09:32:24

20 were experts in both DOCSIS from the cable side and 09:32:27

21 wireless, and the subsequent product put those two 09:32:31

22 technologies together. And that was the product 09:32:33

1 that -- at the time the company merged, so we 09:32:39
2 simultaneous, more or less, with the product 09:32:45
3 development, also the company changed from ARCi to 09:32:48
4 ArcWave when we underwent a merger, and then this 09:32:54
5 new second product became the primary product that 09:32:58
6 we were successful with at ArcWave. 09:33:05

7 Q. So you said the first product was 09:33:07
8 primarily directed towards wireless ISPs; is that 09:33:09
9 right? 09:33:13

10 A. That's correct. 09:33:13

11 Q. The second product was primarily 09:33:15
12 directed towards the cable companies? 09:33:17

13 A. Cable MSOs, correct. 09:33:19

14 Q. You said that the wireless ISPs would 09:33:21
15 have been required to buy a cable headend; is that 09:33:24
16 right? 09:33:27

17 A. Otherwise referred to -- I think I used 09:33:27
18 the term "CMTS," which is the industry -- cable 09:33:29
19 industry terminology for a more or less cable 09:33:33
20 headend. 09:33:41

21 Q. At the time, there were already CMTSS 09:33:41
22 deployed in the field; is that right? 09:33:45

1 A. In which field are you referring to? 09:33:51

2 Q. So my understanding of a CMTS is it is a 09:33:54

3 cable headend located in a regional network that 09:34:04

4 distributes signals to a variety of houses. 09:34:07

5 Is that consistent with your 09:34:10

6 understanding? 09:34:11

7 A. Yes. 09:34:11

8 Q. So when you were saying that the 09:34:12

9 wireless ISPs would have been required to buy a 09:34:19

10 cable headend, there would have already been a cable 09:34:21

11 headend for the cable companies in those 09:34:25

12 neighborhoods; right? 09:34:31

13 A. If DOCSIS -- I mean, with the caveat if 09:34:32

14 DOCSIS was in those neighborhoods. 09:34:34

15 Q. When did you first become familiar with 09:34:36

16 the concept of a CMTS? 09:34:38

17 A. Well, that would be in 1999. 09:34:46

18 Q. So you said you were approached by the 09:34:57

19 cable companies at that time as part of a shift to 09:34:59

20 that second product. 09:35:01

21 Do you recall which cable companies 09:35:03

22 approached you? 09:35:05

1 A. Well, first of all, you said "at that 09:35:06
2 time." Can you be -- I'm not sure what time you're 09:35:07
3 referring to. 09:35:12

4 Q. Neither am I. 09:35:13

5 You said "they came to us because we 09:35:23
6 knew." So at whatever time you were referring to in 09:35:26
7 that last answer. 09:35:29

8 A. Oh, okay. 09:35:30

9 Well, I would be referring to the 09:35:31
10 time that we were deploying our wireless -- our 09:35:32
11 solutions for wireless ISPs, we were approached by 09:35:36
12 cable companies. 09:35:41

13 There was one local cable company, 09:35:42
14 more of a regional player. I'm sorry, I don't 09:35:46
15 recall the name, but they were very excited and open 09:35:50
16 for working with us on what we were capable of -- 09:35:55
17 you know, they had some ideas, and we said what we 09:35:59
18 could do, and it led to an early partnership with 09:36:02
19 this particular cable company because they were 09:36:06
20 eager to deploy the product we were both jointly 09:36:09
21 kind of contemplating. 09:36:13

22 Most importantly, what it gave us 09:36:16

1 was an avenue to test the product. There's a time 09:36:18
2 frame of -- through R&D and development, and we saw 09:36:24
3 that as an opportunity as a test bed for an early 09:36:29
4 adopter. 09:36:36

5 Q. Was that cable company out in 09:36:36
6 California? 09:36:38

7 A. Yep, it was. 09:36:38

8 Q. Did you work with any other cable 09:36:40
9 companies beyond that one local cable company in 09:36:47
10 California? 09:36:51

11 A. Yes, because that product was a success, 09:36:52
12 and the industry buzz spread, and they actually came 09:36:55
13 to us. 09:36:59

14 So I believe out of the top 10 cable 09:37:03
15 companies in the United States, we were ultimately 09:37:07
16 selling product to all but one or two of them. But 09:37:09
17 that's a couple of years forward from the time frame 09:37:13
18 that you were initially asking me about. 09:37:19

19 Q. Did Comcast exist? Sorry. Let me ask a 09:37:22
20 better question. 09:37:28

21 Did you sell that product to 09:37:29
22 Comcast? 09:37:33

1 A. Ultimately, we did. 09:37:33

2 Q. You said "of the top 10," at what point 09:37:34

3 in time were you referring to that top 10? 09:37:46

4 A. Well, that would be the time that the 09:37:48

5 ArcWave product was in production. So can I refer 09:37:49

6 to my CV to get -- try and get the years fairly 09:37:52

7 close. 09:37:57

8 Q. Absolutely. Your CV or anything else. 09:37:57

9 A. So we merged in 2003 to form ArcWave. 09:38:09

10 So I would say -- and again, I'm just going by 09:38:14

11 recollection here on the years, but I would say, 09:38:17

12 roughly speaking -- and again, I could be off by a 09:38:19

13 year, but roughly speaking, we were selling the 09:38:24

14 product to Comcast from about 2004 onward. 09:38:26

15 Could be 2005, but 2004-2005, 09:38:35

16 Comcast was one of our major customers, as well 09:38:41

17 as -- 09:38:43

18 Q. Was -- 09:38:43

19 A. -- as well as, as I said, almost every 09:38:43

20 one of the top 10 cable companies. 09:38:47

21 Q. Was Time Warner one of your customers? 09:38:49

22 A. They were. 09:38:53

1 Q. Was Cox one of your customers? 09:38:53

2 A. They were. 09:38:56

3 Q. Was DirectTV one of your customers? 09:38:56

4 A. They were not. 09:38:59

5 MR. QUALEY: Can you guys just slow 09:39:00

6 down. I'm a little worried about the court 09:39:03

7 reporter. 09:39:03

8 COURT REPORTER: Thank you. 09:39:05

9 Q. Was EchoStar one of your customers? 09:39:05

10 A. No, they were not. 09:39:08

11 THE WITNESS: Sorry, I was waiting 09:39:36

12 for a list of 20 companies. 09:39:38

13 MR. QUALEY: We're still in the 09:39:40

14 first half hour, I don't want to wear the court 09:39:41

15 reporter out. 09:39:44

16 COURT REPORTER: Thank you. 09:39:44

17 BY MR. HALVERSON: 09:39:44

18 Q. This product that you had developed and 09:39:54

19 sold to those cable companies, was that a product 09:39:56

20 that was ultimately used or installed in a user's 09:39:59

21 home? 09:40:06

22 A. Generally, no. 09:40:08

1 Q. Where was that -- 09:40:11

2 A. Well, when you -- let me back up. 09:40:12

3 When you say "user," in my mind, I 09:40:15
4 was inferring a residential customer, but they were 09:40:20
5 generally -- because of the cost involved of the 09:40:23
6 product, it was generally commercial customers. So 09:40:27
7 it would be user's office or office premise, 09:40:31
8 generally speaking. 09:40:35

9 Q. But it was for the on-premise network of 09:40:36
10 the place where the product was installed? 09:40:40

11 A. Well, it was to use a cable modem in 09:40:46
12 locations where cable did not enter that premise. 09:40:49
13 That's the best way I can describe it. 09:40:53

14 Q. When you say "where cable did not enter 09:40:59
15 that premise" -- 09:41:02

16 A. Well -- 09:41:02

17 Q. -- what do you mean by that? 09:41:04

18 A. -- in other words, you have an office 09:41:04
19 building, there's no cable run to it. Time Warner 09:41:07
20 wants to offer DOCSIS to those customers, our 09:41:11
21 product would achieve that for them. 09:41:15

22 Q. So was your product installed in the 09:41:16

1 CMTS? 09:41:19

2 A. No. Well, it had to work with the CMTS, 09:41:21
3 but it was not -- none of our product touched the 09:41:24
4 CMTS, I would say, physical products. Sometimes 09:41:29
5 there may have been settings in the CMTS that would 09:41:34
6 adapt to the fact they were using our product; in 09:41:37
7 other words, settings, but our product did not 09:41:41
8 physically touch the CMTS location. 09:41:46

9 Q. Just for clarity going forward, this 09:41:49
10 second product that we have been talking about, did 09:41:54
11 it have a name? 09:41:57

12 A. ARCXtend. 09:41:58

13 Q. ARCXtend? 09:41:59

14 A. Correct. 09:42:00

15 Q. A-R-C Extend? 09:42:01

16 A. Xtend. 09:42:04

17 Q. A-R-C-X-T-E-N-D? 09:42:07

18 A. Ah. You said that kind of fast, but 09:42:11
19 A-R-C-X-T-E-N-D. 09:42:14

20 Q. So was ARCXtend -- I guess what I'm 09:42:18
21 trying to get to the bottom of is the thing that is 09:42:25
22 ARCXtend, did that exist under the roof and within 09:42:29

1 the walls, or outside? 09:42:35

2 A. You're referring to what my company 09:42:37

3 manufactured? 09:42:47

4 Q. Correct. 09:42:47

5 A. Not the entire system as a whole? 09:42:47

6 Q. Correct. 09:42:49

7 A. So there were two pieces to our system. 09:42:50

8 ARCXtend would have two pieces, and they were both 09:42:55

9 installed outside of, let's say, a rooftop or a 09:43:01

10 cable strand. So outside of the premise where, 09:43:05

11 presumably, the DOCSIS modem would be installed. 09:43:09

12 Q. Then there would be a cable line from 09:43:12

13 the DOCSIS modem to the CMTS? 09:43:13

14 A. No. That's how a normal cable system 09:43:17

15 works. 09:43:20

16 Maybe you could ask the question a 09:43:23

17 little better so I understand where -- and I can 09:43:25

18 help you. 09:43:29

19 Q. Can you describe for me how a cable 09:43:29

20 signal would go from the CMTS and turn into a 09:43:31

21 wireless signal within the business that had 09:43:39

22 purchased an ARCXtend. 09:43:43

1 which was the ARCXtend subscriber unit, and that 09:45:18
2 unit would be placed typically on the roof of this 09:45:23
3 building. 09:45:25

4 If you look at those satellite 09:45:26
5 dishes, it would be -- that would be a good 09:45:27
6 location. It could be placed adjacent to one of 09:45:30
7 those dishes, and it would be pointed toward the 09:45:35
8 other product I had just mentioned, the ARCXtend 09:45:41
9 hub. 09:45:49

10 THE WITNESS: Am I going too fast? 09:45:49

11 COURT REPORTER: No, you're fine. 09:45:49

12 THE WITNESS: Okay. Thank you. 09:45:49

13 COURT REPORTER: Thank you. 09:45:57

14 Q. Were the subscriber units and hubs, did 09:45:57
15 they communicate in a one-to-one relationship? 09:46:02

16 A. No. You could have multiple subscriber 09:46:06
17 units talking to one hub. 09:46:09

18 Q. Why would somebody purchase this 09:46:12
19 ARCXtend as opposed to running a hard-wired cable 09:46:31
20 line? 09:46:35

21 A. Well, that was the business decision of 09:46:36
22 the cable operators. They often did not have cable 09:46:43

1 running to a building, for various reasons. They 09:46:46
2 could vary from just how permits were or it's not 09:46:50
3 always that easy to run a cable into office 09:47:01
4 businesses. It could be zoning. It could be a 09:47:06
5 river or some barrier that prevented the cable 09:47:09
6 company from being able to bridge the wire. 09:47:13

7 So there were a number of reasons 09:47:19
8 why. In some cases, it was just the speed in which 09:47:21
9 you could deploy our system, which is basically in a 09:47:27
10 day. 09:47:30

11 So it offered a lot of advantages to 09:47:32
12 the cable operators. 09:47:34

13 Q. What was the distance over which the 09:47:40
14 wireless hub could be? 09:47:44

15 A. Well, that was dependent on the 09:47:48
16 modulation that they chose to use. 09:47:53

17 So it would vary depending on what 09:47:55
18 level of QAM modulation, primarily in the 09:48:02
19 downstream, that the cable operator would choose to 09:48:04
20 use. 09:48:07

21 Q. So the cable operator would decide the 09:48:11
22 modulation scheme? 09:48:15

1 A. Basically -- well, basically, depending 09:48:20
2 on the distance they wanted to achieve, they could 09:48:26
3 then look at what modulation they would want to 09:48:30
4 employ to communicate over that link and over that 09:48:34
5 distance. 09:48:39

6 Q. Was that hard-coded into the ARCXtend 09:48:42
7 subscriber? 09:48:52

8 A. No, the subscriber would work 09:48:52
9 independent of those decisions. 09:48:55

10 Q. Do you recall what the bandwidth was of 09:49:10
11 that signal? 09:49:13

12 A. Are you referring to upstream or 09:49:16
13 downstream? 09:49:18

14 Q. Was it an asynchronous signal? 09:49:18

15 A. Well, it was bidirectional. 09:49:22

16 Q. The downstream signal. 09:49:24

17 A. The downstream. 09:49:25

18 Generally, if it was -- it would 09:49:29
19 generally be 30, 30-megabit was a typical number. 09:49:32

20 Q. How about the upstream? 09:49:36

21 A. Upstream varied. That depends on 09:49:38
22 multiple DOCSIS settings, but our product -- one of 09:49:42

1 the advantages of our product, it would be 09:49:47
2 compatible with most of the upstreams that the cable 09:49:48
3 company would deploy. 09:49:54

4 Q. Do you recall the carrier frequencies 09:49:55
5 that the ARCxtend products used? 09:50:07

6 A. I do. 09:50:12

7 Q. What were they? 09:50:13

8 A. The downstream was at 5.8 gigahertz, and 09:50:14
9 the upstream was at 2.4 gigahertz. So we used two 09:50:19
10 different frequency bands. 09:50:28

11 Q. Do you have a rough understanding of 09:50:41
12 approximately how many Arc Stream systems were 09:50:48
13 deployed? 09:50:54

14 A. I believe you mean ARCxtend. You said 09:50:54
15 "Arc Stream." 09:50:58

16 Q. I sure do. Let me ask it again. Sorry. 09:50:58

17 Do you have a rough understanding of 09:51:01
18 approximately how many ARCxtend systems were 09:51:04
19 deployed? 09:51:08

20 A. That's a tough question because I left 09:51:09
21 the company two years before they ended that 09:51:14
22 product, and went out of business. I believe 09:51:20

1 because the success of the product was, each year, 09:51:24
2 greater sales, it would have been much greater sales 09:51:29
3 in the two years I was not there. 09:51:33

4 So, honestly, I'd only be guessing 09:51:35
5 as to the exact -- you know, I'm worried I'd give 09:51:42
6 you a number, and I could be off by thousands, so... 09:51:46

7 Q. When you had left, do you have a rough 09:51:50
8 understanding of how many had been deployed by then? 09:51:55

9 A. I think at that point, the number was 09:51:57
10 fairly low because it was just getting adopted by 09:52:00
11 the cable companies. 09:52:03

12 So again, I'm just guessing here 09:52:04
13 that, at the time I left, in the hundreds. 09:52:08

14 Q. All right. 09:52:12

15 Who funded the development of the 09:52:14
16 ARCXtend product? 09:52:17

17 A. Are you referring to our sources of 09:52:18
18 investment at the company, or... 09:52:22

19 Q. We can start there, sure. 09:52:25

20 A. Okay. 09:52:28

21 Because when you said "funded," I 09:52:29
22 mean, I signed the checks for what got spent. 09:52:30

1 But if you're asking, who were our 09:52:33
2 investors, we had, I'm going to say, maybe 30 or 40 09:52:38
3 investors, but primarily, the money came from ten 09:52:48
4 venture capitalists. And then we had 30, again, I'm 09:52:54
5 guessing on the numbers, smaller investors that we 09:52:59
6 carried over from ARCi. And added some -- we had a 09:53:01
7 few VCs, and then at ArcWave, we had much more 09:53:09
8 substantial venture capital funding. 09:53:12

9 Q. Was any of it contract-based from the 09:53:14
10 cable companies? 09:53:17

11 A. When you say "contract-based," in other 09:53:22
12 words, did they fund development? 09:53:25

13 Q. Yes. 09:53:27

14 A. No, only indirectly by providing us 09:53:28
15 purchase orders and paying for them, but we didn't 09:53:31
16 have anybody that paid for contract development. We 09:53:35
17 wanted to own the intellectual property ourselves, 09:53:38
18 and we felt that was the best way to do it. 09:53:42

19 Q. Did you file any patents on ARCXtend? 09:53:45

20 A. We did. 09:53:49

21 Q. Do you know, were they granted? 09:53:50

22 A. Most were granted. 09:53:53

1 Q. So ARCi, A-R-C-I, was the second 09:53:59
2 company? 09:54:28

3 A. First company. 09:54:29

4 Q. First company. 09:54:30

5 ARCi merged into something else? 09:54:31

6 A. ArcWave. 09:54:34

7 Q. ArcWave. 09:54:35

8 So when approximately did you leave 09:54:41

9 ArcWave? 09:54:43

10 A. So I'm going to say around 2007. It 09:55:05

11 was -- I want to be careful on the exact years 09:55:16

12 because I was retained as a consultant for a year. 09:55:18

13 So I may be off one or two years on my recollection. 09:55:22

14 I know my CV, I put 2008, but that 09:55:26

15 may have included a year where I was retained to 09:55:30

16 continue on as a consultant to the company. 09:55:33

17 Q. Before ARCXtend, what about the other 09:55:35

18 product, the first product, did it have a name? 09:56:03

19 A. Let me think. 09:56:13

20 You know what, I think it did, but 09:56:20

21 honestly, I don't recall it. You know, I'm trying 09:56:22

22 to picture in my mind one of the data sheets, and I 09:56:24

1 believe we had a name, but I just can't recall what 09:56:29
2 it was. 09:56:33

3 Q. I'm going to pivot a little bit. 09:57:08
4 Are you familiar with a concept 09:57:11
5 called DMT? 09:57:13

6 A. DMT, are you referring to DMT in 09:57:17
7 multi-carrier context? 09:57:25

8 Q. Why don't you go to Paragraph 49 of your 09:57:26
9 declaration, page 21. 09:57:29

10 A. Okay. 09:57:43

11 Q. So what was your first exposure to 09:57:44
12 discrete multi-tone, or DMT, as far as the 09:57:54
13 transmission scheme? 09:57:57

14 A. Well, I guess a couple of things. 09:58:04
15 One is I was studying DSL and 09:58:05
16 multi-carrier transmission because a friend was 09:58:12
17 working on a company that was providing solutions, 09:58:15
18 and I was fascinated by it. 09:58:19

19 The other is I had a consulting 09:58:21
20 project involving multi-tone -- multi-carrier 09:58:25
21 technology that I had worked on back in -- I believe 09:58:30
22 it was the late 1990s. And I had a consulting 09:58:34

1 company at the time. 09:58:44

2 Q. Do you recall when your friend was 09:58:45

3 working on a company that was providing solutions? 09:58:47

4 A. I believe it was in the 1990s. 09:58:51

5 Q. So both of those instances were at 09:58:53

6 approximately the same time? 09:58:55

7 A. Approximately. I think it might have 09:58:57

8 been Covad, but I'm not positive. 09:59:03

9 Q. C-O-V-I-D? 09:59:07

10 A. Yeah. 09:59:10

11 Q. Like -- 09:59:11

12 A. No, no, not like the virus. Oh, sorry. 09:59:11

13 Honestly, it was many years ago, 09:59:16

14 so... 09:59:19

15 Q. When you say "it might have been 09:59:19

16 Covad"... 09:59:21

17 A. There was a company, I think C-O-V-A-D, 09:59:21

18 that was providing multi-carrier solutions, and I 09:59:27

19 was just fascinated with the technology and I 09:59:33

20 remember studying it, and then later worked on a 09:59:40

21 consulting project at ADBS Corporation, my 09:59:42

22 engineering consulting company at the time. 09:59:46

1 Q. What about multi-carrier solutions 09:59:48
2 fascinated you? 09:59:52

3 A. The fact that you could extend the data 09:59:52
4 rate in a twisted pair environment by using 09:59:57
5 multi-carrier techniques I thought was very 10:00:04
6 interesting. 10:00:07

7 Q. So when you say you studied it, what did 10:00:18
8 you do? 10:00:20

9 A. Studied the standards, look at the 10:00:21
10 chipsets that were available to use at the time. 10:00:25

11 Q. Approximately how much time do you think 10:00:30
12 you spent studying it? 10:00:33

13 A. Boy, that's a tough -- do you count 10:00:36
14 laying in bed dreaming? 10:00:41

15 Q. If you were dreaming about DMT, then 10:00:45
16 yes. 10:00:48

17 A. I'm afraid I'm the kind of guy that does 10:00:49
18 have those kind of dreams. 10:00:52

19 Q. Don't be shy. 10:00:53

20 A. So I -- honestly, it's difficult for me 10:00:54
21 to answer your question, but, you know, significant 10:00:58
22 amount of money, engineering thought process. 10:01:07

1 Q. Do you think you spent on the order of 10:01:09
2 days, weeks, months, or years studying DMT and other 10:01:12
3 multi-carrier transmission schemes? 10:01:18

4 A. Well, years from a time span, but 10:01:21
5 certainly, you know, not full-time in those years. 10:01:23

6 So, you know, less than 50 percent, 10:01:27
7 for sure, over a number of years. 10:01:31

8 Q. Do you think you spent more than 10:01:41
9 10 percent of your time over a number of years? 10:01:44

10 A. 10 percent of my engineering time or 10:01:45
11 10 percent of my total breathing time? 10:01:53

12 Q. I'm not sure, you pivoted a little bit 10:02:00
13 in there. 10:02:02

14 So let's say of your engineering 10:02:03
15 time. 10:02:05

16 A. Yeah. I think 10 percent might be a 10:02:06
17 good number. 10:02:08

18 Q. When you say "over a number of years," 10:02:09
19 two, five, ten? 10:02:15

20 A. Well, it became more significant in 10:02:18
21 later years. So I believe, if I'm wrong, tell me, 10:02:23
22 you're referring to the period in the 1990s, because 10:02:29

1 I spent significantly more time in multi-carrier in 10:02:35
2 subsequent years. 10:02:39

3 Q. So I'm really just trying to figure 10:02:42
4 out -- so you had said -- I can't find it, but I'm 10:02:45
5 paraphrasing. 10:03:03

6 You had said that your exposure to 10:03:04
7 DMT fascinated you, so you were -- you began to 10:03:07
8 study it, and I'm curious as to the amount of time 10:03:14
9 that you would say that you were studying DMT based 10:03:17
10 on what was triggered by that exposure, that 10:03:20
11 fascination? 10:03:24

12 A. Yeah. 10:03:25

13 I think I'll say 10 percent of my 10:03:28
14 engineering time. And I believe back then, I was 10:03:30
15 thinking of getting more involved because it looked 10:03:36
16 like that might be an area that would blossom a lot 10:03:38
17 further. So I was contemplating, you know, larger 10:03:42
18 projects. 10:03:47

19 But I think 10 percent is probably a 10:03:49
20 good number. 10:03:52

21 MR. HALVERSON: It's probably a good 10:04:00
22 time for a break. We have been going about an hour. 10:04:01

1 Take about five minutes. 10:04:03

2 MR. QUALEY: Sure. 10:04:05

3 MR. ROSSI: Let's go off the record. 10:04:08

4 (RECESS, 10:04 a.m. - 10:19 a.m.) 10:04:10

5 BY MR. HALVERSON: 10:19:08

6 Q. Mr. Bertonis, do you have Exhibit 1007 10:19:09

7 in front of you? Do you want another copy? 10:19:15

8 A. Sure. 10:19:20

9 Q. What did I hand you? 10:19:21

10 A. A copy of Exhibit 1007. 10:19:31

11 Q. What is the patent number of 10:19:39

12 Exhibit 1007? 10:19:41

13 A. Well, it's a European number. It's 10:19:42

14 EP/1,087,586/A2. 10:19:48

15 Q. For the life of me in this proceeding so 10:19:55

16 far, I cannot come up with a reasonable 10:19:58

17 pronunciation of this gentleman's last name. 10:20:00

18 Do you have a good one; otherwise, 10:20:02

19 we have been referring to it as Mirfakhraei? 10:20:05

20 A. If you want to use that, that's fine. 10:20:08

21 Q. If I use Mirfakhraei in questions, you 10:20:10

22 will understand that I'm referring to 1007? 10:20:11

1	A.	Yes.	10:20:13
2		Can I use it --	10:20:16
3		(Off the record.)	10:20:33
4	Q.	We're good with Mirfakhraei?	10:20:48
5	A.	Yes.	10:20:50
6	Q.	Cool.	10:20:50
7		You have read this before?	10:20:51
8	A.	I have.	10:20:52
9	Q.	Have you read this before your work on	10:20:53
10		this case?	10:20:55
11	A.	I have not.	10:20:56
12	Q.	Do you know the inventor of Mirfakhraei?	10:20:57
13	A.	I do not know Mirfakhraei.	10:21:09
14	Q.	Have you ever heard of PC-Tel, Inc.,	10:21:18
15		before?	10:21:21
16	A.	I have.	10:21:21
17	Q.	In what context?	10:21:22
18	A.	Just recalling working in Silicon Valley	10:21:24
19		and companies, I recall PC-Tel.	10:21:30
20	Q.	Do you know what they did?	10:21:33
21	A.	You know, I'd rather not answer because	10:21:34
22		I can't remember that accurately. They were just	10:21:44

1 one of the companies I remember hearing that name 10:21:47
2 because of the acronym. 10:21:50

3 Q. Is it fair to characterize Mirfakhraei 10:21:55
4 as generally describing multi-carrier frequency data 10:21:57
5 communication? 10:22:15

6 A. Yes. 10:22:18

7 Q. More specifically, it's directed towards 10:22:18
8 the same DMT protocols that we were talking about a 10:22:22
9 little bit ago? 10:22:26

10 A. Well, I believe its applicability would 10:22:27
11 be to all broadband communications. 10:22:30

12 Q. What do you mean by that? 10:22:35

13 A. What -- the techniques I see in 10:22:38
14 Mirfakhraei, to me, are applicable to broadband, not 10:22:40
15 necessarily limited to DMT or protocols that went 10:22:52
16 over twisted pair, for instance. 10:22:58

17 Q. What about the disclosure of Mirfakhraei 10:23:01
18 suggests that to you? 10:23:14

19 A. Well, can I look through for a minute? 10:23:16

20 Q. Sure. Sure. 10:23:21

21 A. Okay. Thank you. 10:23:22

22 Q. Just for the record, there is some 10:23:34

1 highlighting. 10:23:35

2 A. There's yellow -- 10:23:36

3 Q. I'm not sure why or what -- 10:23:37

4 A. Do you want me to go back and use mine? 10:23:38

5 Q. You are welcome to use your clean copy, 10:23:40

6 if it's easier for you. 10:23:42

7 A. It might be easier for me because -- 10:23:43

8 plus maybe not fair to you. I don't know. 10:23:45

9 What was the exhibit number again? 10:23:54

10 Q. 1007. 10:23:57

11 A. Thank you. 10:23:58

12 (PAUSE in the proceedings.) 10:26:06

13 A. So as I read Mirfakhraei, yes, most of 10:27:23

14 the examples show DMT, but clearly, they state, for 10:27:26

15 instance, and again, you know, I just scanned 10:27:35

16 through to find what I thought would be applicable, 10:27:37

17 but it says, "Although the invention has been 10:27:39

18 described with reference to particular embodiments, 10:27:45

19 the description is only an example of the 10:27:47

20 invention's application and should not be taken as a 10:27:51

21 limitation. 10:27:53

22 For example, the above-described 10:27:57

1 order in which adjustments are made to the loadings 10:27:59
2 and gains of subchannels is based on size 10:28:02
3 differences." (As read.) 10:28:05

4 So I take that as saying that 10:28:07
5 there's broader applicability to the concept of bit 10:28:08
6 loading, and they're using DMT as an example, but 10:28:13
7 not a limitation. 10:28:18

8 Q. Can you look at Paragraph 2 of 10:28:26
9 Mirfakhraei for me, please. 10:28:28

10 About halfway through Paragraph 2, 10:28:34
11 and feel free to read the whole thing or anywhere 10:28:36
12 else that would be helpful for you, the sentence 10:28:39
13 beginning with the word "Generally." It goes on to 10:28:41
14 say that, "...high frequencies are difficult to 10:28:46
15 accurately transmit using systems such as 10:28:53
16 conventional telephone lines." 10:28:55

17 Do you see that? 10:28:57

18 A. "Generally, a higher frequency carrier 10:28:59
19 signal permits a higher data transmission rate..." 10:29:03

20 Is that the sentence you're 10:29:06
21 referring to? 10:29:07

22 Q. Mm-hmm. 10:29:08

1 A. Okay. I see that sentence and the 10:29:09
2 subsequent sentence. 10:29:22

3 Q. What is it about high frequencies that 10:29:23
4 make it difficult to accurately transmit using 10:29:26
5 systems such as conventional telephone lines? 10:29:29

6 A. Well, in general, over any type of line, 10:29:36
7 the higher -- and I'm speaking generally, the higher 10:29:40
8 the frequency, the more the attenuation, and the 10:29:44
9 more type of problems that will occur, including 10:29:47
10 reflections and impairments. 10:29:51

11 So I'm just saying, generally, and 10:29:53
12 this is whether we're talking about coax or twisted 10:29:55
13 pair or other type of mediums, the higher you go in 10:29:59
14 frequency generally spells more problems, more 10:30:11
15 impairments. 10:30:14

16 Q. So the last sentence of that paragraph, 10:30:16
17 "Accordingly, the maximum data rate of a 10:30:22
18 conventional modem architecture is limited." 10:30:24

19 Do you see that? 10:30:27

20 A. Yes. 10:30:27

21 Q. So what did that attenuation that you 10:30:28
22 were just referring to impacts the data rate? 10:30:32

1 A. The ability to send higher frequencies 10:30:34
2 over that medium. So... 10:30:39

3 Q. You said so. I'm not sure if you've got 10:30:52
4 another sentence or -- 10:30:55

5 A. No. 10:30:56

6 Q. I'm not sure I understand what you mean 10:30:59
7 when you -- with that answer. 10:31:03

8 So what does frequency attenuation 10:31:05
9 have to do with data rate, and your answer was, "The 10:31:11
10 ability to send higher frequencies." So how does 10:31:16
11 the ability to send higher frequencies impact data 10:31:24
12 rate? 10:31:28

13 A. Well, we're talking about a carrier 10:31:28
14 frequency. A higher carrier frequency would be both 10:31:30
15 attenuated and face more impairments as the 10:31:36
16 frequency goes up, and that would be true whether 10:31:39
17 it's a twisted pair or a coaxial cable or other 10:31:41
18 transmission mediums. 10:31:48

19 I say that as a general statement. 10:31:49

20 Q. So how does DMT address those problems? 10:31:55

21 A. By using multi-carrier transmission. 10:31:59

22 Q. Does that mean that they're using 10:32:03

1 different frequencies? 10:32:06

2 A. It means they're using different carrier 10:32:07
3 frequencies, multiple carrier frequencies, instead 10:32:12
4 of, for instance, just one. 10:32:17

5 Q. So what does that have to do with 10:32:19
6 attenuation? 10:32:24

7 A. Well, by using multiple carriers, you're 10:32:25
8 able to overcome impairments, including attenuation, 10:32:35
9 because some carriers will be more successfully 10:32:43
10 transmitted than other carriers will be. 10:32:48

11 Q. Are you familiar with the frequency 10:32:54
12 carrier range of ADSL? 10:33:01

13 A. Well, if you're asking me to cite the -- 10:33:07
14 a chart of the specific typical and maximum 10:33:11
15 frequencies of different DSLs, I don't have that -- 10:33:15
16 I'd have to refer to a chart. 10:33:22

17 Q. Do you know what -- do you have a rough 10:33:25
18 idea of where in the frequency band DSL operates? 10:33:27

19 A. Generally. 10:33:32

20 Q. Where? 10:33:35

21 A. Low, low range. Well, we're sending 10:33:36
22 hundreds of kilobits or low megabits. So generally 10:33:44

1 low -- low megahertz, or hundreds of kilohertz. 10:33:49

2 Q. What is a subchannel? 10:34:04

3 A. Well, you're asking -- I believe you're 10:34:07

4 asking in the context of multi-carrier transmission; 10:34:09

5 otherwise, I'm not sure what you're asking. 10:34:17

6 Q. Yes, in the context of -- I'm looking at 10:34:23

7 Paragraph 3? 10:34:25

8 A. Okay. 10:34:25

9 Q. It uses the word "subchannel." I'm just 10:34:26

10 curious as to what your understanding of 10:34:28

11 "subchannel" is. 10:34:31

12 A. Okay. Well, let me read that paragraph. 10:34:31

13 Q. Sure. 10:34:33

14 A. Okay. In this context, they're 10:34:34

15 referring to a 4 kilohertz subchannel. 10:34:59

16 Q. How do you differentiate a subchannel 10:35:03

17 from a channel? 10:35:06

18 A. Well, in DMT there's multiple 10:35:14

19 subchannels. Your question, are you referring to 10:35:17

20 carriers? 10:35:24

21 Q. Is there a different -- 10:35:28

22 A. Or channels. I'm a little confused by 10:35:29

1 your question. If you're asking about carrier 10:35:32

2 spacing, number of carriers, or something else. 10:35:36

3 Q. Just curious as to how you interpret the 10:35:42
4 word "subchannel" in Paragraph 3. 10:35:45

5 A. Well, in the context of Paragraph 3, 10:35:49
6 they're talking about putting multiple carriers, 10:36:10
7 which I believe they're calling the subchannel, and 10:36:15
8 showing an example of a 4 kilohertz bandwidth for 10:36:19
9 that subchannel. 10:36:25

10 Q. Now, Mirfakhraei describes a handshake 10:36:29
11 process; is that right? 10:36:34

12 A. I believe so. 10:36:38

13 Q. Do you know what the purpose of that 10:36:39
14 handshake process is? 10:36:42

15 A. Well, in the context of Mirfakhraei, I 10:36:43
16 believe it's to exchange information so we can 10:37:07
17 determine the bit loading. 10:37:12

18 Q. Exchange between what? 10:37:15

19 A. From -- can I refer to the diagram that 10:37:17
20 shows that in Mirfakhraei, can I find that in 10:37:29
21 Mirfakhraei and then answer your question? 10:37:30

22 Q. Sure. 10:37:41

1 A. So it would be the communications 10:37:41
2 between the transmitter and the receiver. 10:37:42

3 Q. You're looking at Figure 1? 10:37:44

4 A. I am. 10:37:46

5 Q. So we've got a transmitter on the left 10:37:47
6 side and a receiver on the right side? 10:37:49

7 A. I believe it's the other way around. 10:37:50
8 Well, as you're -- 10:37:52

9 Q. You're right. 10:37:53

10 A. As you're looking at it. 10:37:54

11 Q. We have a receiver on the left side and 10:37:56
12 a transmitter on the right side? 10:37:58

13 A. Yes. 10:37:59

14 Q. How often does that handshake process 10:37:59
15 happen? 10:38:19

16 A. If you're asking the exact timing, I 10:38:31
17 don't have a number for you what, how often that is. 10:38:34

18 Q. Do you have an opinion about whether or 10:38:39
19 not Mirfakhraei explains how often this handshake 10:38:41
20 process happens? 10:38:47

21 A. I can read through it and see if I can 10:38:48
22 answer your question better by reading through it. 10:38:57

1 Q. If you think that would be helpful. 10:39:01

2 A. So I can't find the specific citing of 10:40:15
3 timing, but my understanding, it would be roughly 10:40:17
4 coincident with any change in bit loading. 10:40:28

5 Q. Would it be as a result of a change in 10:40:29
6 bit loading or would it cause the change in bit 10:40:34
7 loading? 10:40:38

8 A. I see it as the -- causing the change in 10:40:38
9 bit loading, that would be my understanding. 10:40:41

10 Q. So the change in bit loading can't cause 10:40:44
11 the handshake to happen? 10:40:46

12 A. There may be further handshake. I mean 10:40:49
13 I'd have to study exactly the context of where they 10:40:55
14 specifically talk about the handshaking, but my 10:40:59
15 understanding as I read the patent, you need to have 10:41:01
16 a basis for communicating the bit loading changes, 10:41:05
17 and the handshake is the mechanism used to achieve 10:41:10
18 that. 10:41:12

19 Q. Trying to iron out the order on this, 10:41:20
20 because it sounds like that last answer said the 10:41:23
21 handshake is used to communicate the bit loading 10:41:29
22 change, and then earlier, you had said that the 10:41:32

1 handshake is used to determine the bit loading. 10:41:44

2 I'm curious as to how you reconcile 10:41:48

3 those two. 10:41:51

4 A. Well, the -- the actual determination of 10:41:51

5 the bit loading is based on parameters that, that 10:41:55

6 signal-to-noise ratio, but to achieve that bit 10:42:02

7 loading, there's a handshake that's back and forth 10:42:06

8 that's necessary. 10:42:10

9 Q. What is communicated in that handshake? 10:42:12

10 A. Presumably the information for -- for 10:42:14

11 achieving the bit loading. 10:42:29

12 Q. What is that? What is that information? 10:42:30

13 A. What is that information? 10:42:33

14 Q. (Nods head up and down.) 10:42:34

15 A. Well, I'd have to -- I mean I'd have to 10:42:35

16 study the context of the patent to see if they give 10:42:39

17 examples, but as I read it, that's the mechanism -- 10:42:42

18 you'd need a mechanism, and that would be the 10:42:46

19 mechanism that's used to achieve that. 10:42:48

20 If you're asking -- are you asking 10:42:50

21 what is the timing, or what's your question? 10:42:54

22 Q. You had said the handshake exchanges 10:42:58

1 information for achieving bit loading, and I'm 10:43:04
2 wondering if you have an opinion about what 10:43:06
3 information is exchanged to achieve bit loading? 10:43:08

4 A. Well, to some extent it would be up to 10:43:13
5 the person implementing the invention how they want 10:43:16
6 to design and build it. But if you're asking for an 10:43:19
7 example, I can read the patent further and try to 10:43:29
8 find an example -- but, in general, it would be the 10:43:32
9 mechanism for that would be necessary to achieve the 10:43:37
10 bit loading. Not the information, such as signal to 10:43:42
11 noise. That's the actual basis for the bit loading. 10:43:51

12 Q. Let's go to Paragraph 20 of Mirfakhraei. 10:43:59
13 Second sentence, it says, "Typically, the handshake 10:44:04
14 signal includes a pattern that the remote 10:44:07
15 transceiver requests or indicates a pattern for the 10:44:10
16 remote transceiver to transmit to receiver 190." 10:44:15

17 Do you see that? 10:44:20

18 A. Yes. 10:44:20

19 Q. So if my understanding of what's sent is 10:44:21
20 a predetermined signal pattern; is that consistent 10:44:24
21 with your understanding? 10:44:28

22 A. Well, it says typically, so it could be 10:44:29

1 other things as well. But let me further read it. 10:44:34

2 Q. You're welcome to keep reading, but we 10:44:51

3 may be able to short-circuit some of this. 10:44:54

4 If you go to Paragraph 22. 10:44:56

5 A. Okay. 10:44:57

6 Q. Second sentence, it says, "The estimated 10:44:58

7 signal-to-noise ratio, SNR(i) can be determined, for 10:45:00

8 example, by directing the remote transceiver 10:45:08

9 transmitting known pseudo-random signal and then 10:45:11

10 comparing the received signal to the known signal." 10:45:17

11 Do you see that? 10:45:17

12 A. Yes. 10:45:18

13 Q. Is it fair to say that the way that the 10:45:18

14 Mirfakhraei calculates the SNR is to send a known 10:45:20

15 signal from one transceiver to the other and look at 10:45:25

16 what is received? 10:45:28

17 A. Okay. Can you -- I think I have it. 10:45:31

18 Can you repeat the question, please. 10:46:09

19 Q. Is it fair to say that the way that 10:46:10

20 Mirfakhraei calculates the SNR is to transmit a 10:46:12

21 known signal from one transceiver to the other and 10:46:16

22 look at what is received? 10:46:20

1 A. Well, I would say by look, it's looking 10:46:26
2 at the signal-to-noise ratio, so that's important. 10:46:33

3 So just looking is one thing, but 10:46:37
4 actually the important parameter is the 10:46:46
5 signal-to-noise ratio. 10:46:49

6 Q. So it's your understanding of 10:46:50
7 Paragraph 22 of Mirfakhraei that what is sent is 10:46:52
8 the signal-to-noise ratio? 10:46:54

9 A. No. The signal-to-noise ratio is 10:46:58
10 estimated, and what's sent is a known -- a known 10:47:09
11 signal. And then -- and it says by comparing the 10:47:12
12 received signal to a known signal. 10:47:20

13 So from that, you're able to make an 10:47:22
14 estimate on the signal-to-noise ratio. 10:47:26

15 Q. What form does that pseudo-random signal 10:47:28
16 take? 10:47:34

17 A. I don't know the exact form, but 10:47:38
18 generally, it's something fairly simple generally, 10:47:40
19 but if it's cited more specifically, I'd have to 10:47:46
20 look it up in Mirfakhraei. 10:47:49

21 Q. Let's go back to Figure 1 for a second. 10:48:19
22 Other way. In Europe, they're backwards. In 10:48:21

1 Europe, they're backwards. The figures are at the 10:48:31
2 back. 10:48:34

3 So that transmitter handshake, we 10:48:34
4 see that on the right-hand side, 120; is that right? 10:48:38

5 A. Yes. 10:48:42

6 Q. So that handshake process goes through 10:48:42
7 control 130? 10:48:45

8 A. Yes. 10:48:46

9 Q. And then it goes on to the receiver 10:48:47
10 side? 10:48:49

11 A. Yes. 10:48:50

12 Q. And then whatever comes back from the 10:48:50
13 receiver goes back through control 130? 10:48:53

14 A. I would say bidirectional arrow, so I 10:48:56
15 would say interpret that as handshakes can go back 10:49:01
16 and forth. 10:49:03

17 Q. That's consistent with what we were just 10:49:03
18 talking about; right? 10:49:06

19 A. Generally. 10:49:06

20 Q. So what does that control 130 do? 10:49:08

21 A. Well, I'd have to look it up, but in the 10:49:14
22 context of what we were just reading, it clearly 10:49:19

1 says that the handshaking -- well, the measurement 10:49:22
2 of the signal-to-noise -- estimate of the 10:49:27
3 signal-to-noise, and through the handshaking is used 10:49:31
4 to determine the bit loading. I believe I just 10:49:34
5 previously read that when I was... 10:49:38

6 Q. So is it your -- sorry. I didn't mean 10:49:49
7 to interrupt. 10:49:51

8 A. No. Go ahead. 10:49:52

9 Q. So is it your understanding that it is 10:49:53
10 the handshake module 120 that does that, or the 10:49:54
11 control module 130 that does that? 10:49:59

12 A. Probably a combination. 10:50:01

13 Q. Does Mirfakhraei have any description 10:50:08
14 about how the handshake process could work if there 10:50:10
15 was no control 130? 10:50:13

16 A. So I believe your question is if I took 10:50:39
17 out the box of 130 -- can you repeat the question 10:50:44
18 because I'm a little -- 10:50:49

19 Q. Sure. 10:50:53

20 A. Sorry to say it, I'm a little confused. 10:50:53
21 I missed that. 10:50:56

22 Q. Does Mirfakhraei, Exhibit 1007, have any 10:50:56

1 description about how the handshake process of 10:50:59
2 Mirfakhraei would work if there was no control 130? 10:51:03
3 A. Wow. That's like a hypothetical 10:51:06
4 question. 10:51:10
5 Q. So just so we're on the same page -- 10:51:13
6 A. Yeah. 10:51:15
7 Q. -- I'm just asking whether or not you're 10:51:16
8 aware of any description in Mirfakhraei about how 10:51:19
9 that would work. 10:51:23
10 A. Yeah. 10:51:24
11 Q. I'm not asking you to contemplate how 10:51:24
12 Mirfakhraei disclosure would work in a different 10:51:28
13 situation. 10:51:30
14 A. Well, I don't think so because I clearly 10:51:30
15 see in Paragraph 23 that control 130 is directing 10:51:32
16 the transmitter of the determined bit loading. 10:51:37
17 So -- so -- can you repeat your 10:51:45
18 question again? 10:51:50
19 Is it -- 10:51:51
20 Q. Sure. 10:51:52
21 Does Mirfakhraei, Exhibit 1007, have 10:51:52
22 any description about how the handshake process of 10:51:57

1 Mirfakhraei would work if there was no control 130? 10:52:00

2 A. Okay. I mean, I don't see it offhand, 10:52:04

3 but I'd have to -- you're asking me to spend an hour 10:52:09

4 to read every -- reread every line in the patent, so 10:52:12

5 it's a tough question. But through what I'm looking 10:52:16

6 at now, I don't -- it's a tough question for me to 10:52:21

7 answer if something didn't exist, what would happen. 10:52:25

8 Q. So fair to say that the control 130 of 10:52:30

9 Mirfakhraei is an important component of that 10:52:33

10 handshake process? 10:52:35

11 A. Well, it's part of the process, as 10:52:36

12 described in the patent description. 10:52:37

13 Q. Are you still on Figure 1? Yeah. 10:52:40

14 So at the bottom in the middle, it's 10:52:46

15 a hybrid circuit 150. 10:52:48

16 Do you see that? 10:52:49

17 A. Yes. 10:52:50

18 Q. What's that? 10:52:50

19 A. Well, I believe that's some sort of an 10:52:58

20 integrated circuit that is receiving from the 10:52:59

21 transmitter deck and sending a signal to the 10:53:01

22 receiver ADC, and then also a line 152, which I 10:53:09

1 assume is the data stream, but I'd have to look that 10:53:17
2 up, but a hybrid circuit. 10:53:20

3 Q. So my understanding of hybrid is, you 10:53:25
4 know, a collection of things from two or more 10:53:29
5 sources; is that fair? 10:53:37

6 A. Well, generally, what it is is multiple 10:53:41
7 integrated circuits put on the same substrate. 10:53:50

8 So this is very general. Sort of 10:53:58
9 halfway between a discrete and an ASIC, you have -- 10:54:00
10 you know, if you looked at a hierarchy of discrete 10:54:07
11 chip -- well, discrete transistors, discrete chips, 10:54:10
12 hybrids and ASICs. So it would be on that hierarchy 10:54:16
13 in terminology. 10:54:20

14 But I would say, functionally, it 10:54:21
15 could be anything, and although they call it hybrid 10:54:23
16 circuit, it could be any of the other two that I 10:54:28
17 mentioned in that flow could achieve the same 10:54:31
18 function. 10:54:34

19 Q. Go back to Paragraph 15. 10:54:35

20 Do you see that -- or are you there, 10:54:46
21 excuse me? 10:54:52

22 A. I think so. Where it starts off, 10:54:52

1 "Figure 1"? 10:54:54

2 Q. Yep. 10:54:55

3 So Paragraph 15 explains that 10:54:57

4 Figure 1 is on the client side of an ADSL network; 10:54:59

5 is that right? 10:55:02

6 A. Connected to a conventional telephone 10:55:03

7 line via a hybrid circuit. 10:55:07

8 Is that the part you're -- 10:55:09

9 Q. Yep. 10:55:11

10 A. Okay. Thank you. 10:55:11

11 Q. So that hybrid circuit is part of the 10:55:16

12 access point; is that right? 10:55:21

13 A. Well, it would be connecting to -- by 10:55:27

14 "access point," talking about everything at the -- 10:55:29

15 for instance, home, everything in that box, is that 10:55:35

16 what you mean by "access point"? 10:55:38

17 Q. I mean the point that allows the 10:55:41

18 circuitry of Figure 1 of Mirfakhraei to connect to a 10:55:45

19 telephone line. 10:55:49

20 A. So repeat the -- sorry, the question. 10:56:00

21 Q. So the hybrid circuit is part of the 10:56:04

22 access point; is that right? 10:56:08

1 A. I guess that's one way of phrasing it. 10:56:09

2 Q. How would you describe what the hybrid 10:56:26

3 circuit 150 of Mirfakhraei does? 10:56:29

4 A. Well, I know there's different examples 10:56:32

5 because they say, an "...alternative is hybrid 10:56:59

6 hardware/software transceiver such as..." they give 10:57:06

7 an example of a hybrid circuit. 10:57:13

8 I mean, it's the circuitry that 10:57:21

9 interfaces to the line, so there could be a lot of 10:57:23

10 circuitry in there. 10:57:28

11 I'd have to look through the patent 10:57:29

12 to see if it's further broken out into separate 10:57:31

13 blocks of what's in there. 10:57:34

14 Q. So if we look at Figure 1, are 10:57:45

15 transmitter 190 and receiver -- pardon me. I got 10:58:00

16 that backwards. Start over. 10:58:03

17 If we look at Figure 1, are 10:58:05

18 transmitter 110 and receiver 190 part of the same 10:58:07

19 transceiver or different transceivers? 10:58:12

20 A. Well, transceiver is receiver -- is 10:58:18

21 receiver transmitter, so -- I guess, what's your 10:58:29

22 question? Is your question, is it a transceiver? 10:58:40

1 Q. So we talked about how the hybrid 10:58:43
2 circuit 150 is the circuitry that interfaces to the 10:58:46
3 line; right? 10:59:10

4 A. Correct. 10:59:11

5 Q. So what I'm trying to figure out is in 10:59:11
6 Figure 1, where it depicts a handshake going from 10:59:22
7 the transmitter to the receiver across control 130 10:59:27
8 that sits between transmitter and receiver 110 and 10:59:32
9 190, is that hybrid circuit also sitting between 10:59:37
10 transmitter 190 and receiver -- darn it -- 10:59:42
11 transmitter 110 and receiver 190, or is that hybrid 10:59:46
12 circuit the input of the data coming from the 10:59:51
13 telephone line into a transceiver, which is the 10:59:57
14 combination of transmitter 110 and receiver 190? 11:00:02

15 A. I think both. 11:00:05

16 Q. So if they were combined into one 11:00:10
17 transceiver, what would the purpose of the handshake 11:00:21
18 from the transmitter to the receiver be? 11:00:25

19 A. In the context of bit loading? 11:00:27

20 Q. Yeah, which was in the context of how 11:00:37
21 you described control 130's purpose in the handshake 11:00:43
22 between the two, yes. 11:00:48

1 A. So can you repeat the question, sorry. 11:00:52

2 Q. If transmitter 110 and receiver 190 were 11:00:55
3 combined into one transceiver, what would the 11:00:59
4 purpose of the handshake from the transmitter to the 11:01:02
5 receiver be? 11:01:05

6 A. Well, it would be the same purpose. 11:01:06

7 Q. So you would have a calculation of SNR 11:01:10
8 between the transmitter and the receiver of one 11:01:13
9 transceiver in order to send data between the 11:01:16
10 transmitter and the receiver of that transceiver? 11:01:19

11 MR. QUALEY: Objection to form. 11:01:27

12 A. I just want to read a couple of things 11:02:12
13 to get some context. 11:02:14

14 So your question is a little 11:05:05
15 confusing, why I had to read it, because there's two 11:05:06
16 transceivers. There's a remote transceiver and a 11:05:11
17 local transceiver. So when you started talking 11:05:17
18 about combination, it kind of confuses the issue a 11:05:21
19 little. 11:05:28

20 I hope you weren't referring to 11:05:29
21 combining the receiver of one with the transmitter 11:05:31
22 of the other, which would be nonsensical. 11:05:34

1 So maybe you can repeat the question 11:05:36

2 again. Sorry. 11:05:43

3 Q. So is it your understanding, then, that 11:05:43

4 the transmitter 110 and the receiver 190, depicted 11:05:45

5 in Figure 1 of Mirfakhraei, are of two separate 11:05:50

6 transceivers? 11:05:57

7 A. Well, each side has a receiver and a 11:06:03

8 transmitter, so... 11:06:05

9 So again, I'm not sure of your 11:06:39

10 question, but I would interpret Figure 1 overall as 11:06:40

11 a transceiver. 11:06:45

12 Q. Can you go back to Paragraph 20 for me. 11:06:47

13 Let me know when you're there. 11:06:53

14 A. Okay. 11:06:58

15 Q. First sentence says, "Transmitter 110 11:06:59

16 also includes a TX handshake block 120 which 11:07:02

17 generates time domain samples for handshake 11:07:08

18 signal..." and then it goes on. 11:07:12

19 Do you see that? 11:07:14

20 A. Yes. 11:07:14

21 Q. What is a time domain sample? 11:07:14

22 A. Samples in the time domain. 11:07:17

1 Q. All right. 11:07:24
2 What's that? 11:07:25
3 A. Well, time is time, and -- versus, for 11:07:26
4 instance, frequency domain. 11:07:31
5 So there's -- those are the two 11:07:33
6 major domains we would refer to. 11:07:35
7 Q. Could you go to the front cover of 11:07:40
8 Mirfakhraei. I want to ask you about the abstract, 11:08:06
9 which is number (57) there. 11:08:15
10 Go ahead and read it, let me know 11:08:17
11 when you're ready to chat about it. 11:08:20
12 A. Want me to read it out loud or just -- 11:08:22
13 Q. No. 11:08:25
14 A. -- to myself. 11:08:25
15 Q. Just to yourself. 11:08:27
16 A. Okay. Thank you. 11:08:28
17 Okay. 11:09:52
18 Q. The first full sentence in the 11:09:53
19 right-hand column begins, "The gains." 11:09:56
20 Do you see that? 11:09:58
21 A. Yes. 11:09:59
22 Q. What kind of gains is that referring to, 11:09:59

1 the power gains? 11:10:01

2 A. Well, I'm assuming they're referring to 11:11:58

3 the gains in the data rate. 11:12:00

4 Q. So the last sentence in that paragraph 11:12:03

5 talks about "gains of the channel having decrease 11:12:05

6 loadings are decrease to improve power efficiency. 11:12:08

7 (As read.) 11:12:13

8 So is it your understanding that 11:12:13

9 that's the same "gains" that's referred to in the 11:12:15

10 sentence we were just talking about? 11:12:16

11 A. Well, not necessarily, because we're 11:12:26

12 talking about bit error rate in the beginning of 11:12:33

13 that column, and then the last sentence, they're 11:12:36

14 talking about power efficiency, which are sometimes 11:12:43

15 related, but two separate things. 11:12:47

16 Q. Can you tell me where it's talking about 11:12:56

17 bit error rate. 11:12:58

18 A. The gain -- the second column, second 11:12:59

19 sentence, "The gains for the selected channels are 11:13:04

20 increased to maintain the desired bit error rate at 11:13:06

21 the higher loading." 11:13:09

22 Q. So it's your understanding that that 11:13:10

1 sentence is saying that gains in the data rate are 11:13:11
2 increased to maintain the bit error rate at a higher 11:13:24
3 loading? 11:13:30

4 A. Well, it's a little confusing how it's 11:13:30
5 written, but I -- can you repeat your question. 11:13:32

6 Q. It's your understanding that that 11:13:40
7 sentence is saying that gains in the data rate are 11:13:48
8 increased to maintain the bit error rate at a higher 11:13:50
9 loading? 11:13:54

10 A. Well, what I see is a process that is 11:13:55
11 trying to set the bit error rate, and then, finally, 11:14:04
12 they can -- if they have the room, they can change 11:14:11
13 the bit loading to improve power efficiency. 11:14:15

14 So almost like a two-stage process, 11:14:18
15 perhaps. 11:14:22

16 Q. So is there more power consumed at a 11:14:23
17 higher bit loading rate? 11:14:26

18 A. It would depend. 11:14:34

19 Q. On what? 11:14:34

20 A. Well, again, reading this, if they -- 11:14:35
21 again, when they refer to "power efficiency," I'd 11:14:54
22 have to read through the patent to see exactly what 11:14:57

1 they're referring to, but a different modulation can 11:15:00
2 have different power efficiencies, so it may mean 11:15:04
3 what they were referring to is a tradeoff between 11:15:07
4 the modulation and the power efficiency. 11:15:10

5 Q. How do you know what the power 11:15:17
6 efficiency of a modulation is? 11:15:18

7 A. Generally? 11:15:20

8 Q. In Mirfakhraei. 11:15:24

9 A. Okay, again, I'd have to read through 11:15:27
10 their examples to get in particular. I can answer 11:15:29
11 the question generally, but.... 11:15:31

12 Q. So you said, what you saw in the 11:16:02
13 abstract there was that they can change the bit 11:16:04
14 loading to improve power efficiency. 11:16:07

15 What is the impact of bit loading on 11:16:12
16 power efficiency? 11:16:15

17 A. Well, if you change -- for instance, if 11:16:16
18 you changed modulation to -- and again, this is just 11:16:19
19 something general. 11:16:27

20 If you changed modulation, for 11:16:28
21 instance, from 64-QAM to QPSK, QPSK would have 11:16:30
22 greater power efficiency. 11:16:36

1 Q. So QPSK uses less power to transmit -- 11:16:38

2 excuse me. Let me try that again. 11:16:43

3 QPSK has more power efficiency than 11:16:45

4 64-QAM? 11:16:48

5 A. Yes. 11:16:49

6 Q. How do you measure power efficiency? 11:16:49

7 A. Well, again, it depends on the context 11:16:52

8 of how they're talking about it, but QPSK can 11:16:54

9 transmit the same error rate at a lower power level 11:17:04

10 than, for instance, 64-QAM, so the actual efficiency 11:17:08

11 is increased, but the data rate is -- could be 11:17:17

12 decreased. 11:17:22

13 So, again, it's a little confusing 11:17:23

14 how they write this. So it's hard for me to -- you 11:17:25

15 know, you're asking me to try and get into their 11:17:28

16 heads. 11:17:31

17 But I assume what they're saying is 11:17:34

18 that they can do a further adjustment of bit loading 11:17:36

19 to play with their power efficiency. 11:17:39

20 Q. Go to Paragraph 4. I think it's the 11:17:43

21 next page. Last sentence of Paragraph 4. 11:17:45

22 It says, "...differences between 11:17:51

1 subchannels may be difficult to characterize and may 11:17:53
2 vary from one communication connection to the next." 11:17:56
3 Do you see that? 11:17:59
4 A. Paragraph 4? 11:17:59
5 Q. Yep. The last sentence. 11:18:02
6 A. Okay. So you're referring to the last 11:18:41
7 sentence, "...the difference between subchannels may 11:18:43
8 be difficult to characterize and may vary from one 11:18:45
9 communications connection to the next." (As read.) 11:18:49
10 Is that what you're referring to? 11:18:51
11 Q. Yep. 11:18:54
12 A. Then what was your question? 11:18:54
13 Q. When that sentence says, "one 11:18:56
14 communication connection," what's it referring to? 11:18:59
15 A. Well, I believe it would be two nodes on 11:19:01
16 the network. 11:19:26
17 MR. HALVERSON: Take another break? 11:19:32
18 Five minutes? 11:19:34
19 MR. QUALEY: Sure. 11:19:35
20 (RECESS, 11:19 a.m. - 11:28 a.m.) 11:19:36
21 BY MR. HALVERSON: 11:28:51
22 Q. Mr. Bertonis, just to reorient back 11:28:52

1 where we were, we were talking about that last 11:28:54
2 sentence at Paragraph 4 of Mirfakhraei. I had asked 11:29:00
3 what the "one communication connection" was. You 11:29:05
4 said that you believed it was two nodes on the 11:29:11
5 network. 11:29:13

6 When you say "the network," 11:29:13
7 referring to a local network or a wide area network? 11:29:15

8 A. Well, subchannels on whatever network is 11:29:20
9 in the context of the DMT modems that are being 11:29:25
10 used, and they're evaluating the channels, it's the 11:29:33
11 user's modems talking to another modem somewhere, 11:29:41
12 and it's over in that channel you're evaluating the 11:29:45
13 subchannels. 11:29:53

14 Q. So in this section where Mirfakhraei 11:29:55
15 describes DMT, it gives some examples of various DSL 11:30:00
16 technology. 11:30:06

17 Do you see that? 11:30:06

18 A. Which paragraph? 11:30:09

19 Q. One above in Paragraph 4. Or excuse me, 11:30:10
20 Paragraph 3. 11:30:13

21 A. Okay. Yes. 11:30:14

22 Q. Have you ever seen DSL used in a local 11:30:19

1 area network to transmit from one node to another 11:30:21

2 node within the same LAN? 11:30:25

3 A. So, in other words, in a LAN in a home, 11:30:27

4 would you use DSL to go from one room to another; is 11:30:31

5 that your question? 11:30:35

6 Q. That's an example of -- yeah. 11:30:37

7 A. Yeah. Generally not. 11:30:38

8 Q. Why not? 11:30:42

9 A. Well, you're asking me an economic 11:30:43

10 question of how the industry developed. I can just 11:30:47

11 say it's more costly, and the longer the length that 11:30:52

12 you're trying to overcome impairments, the more 11:30:58

13 productive those techniques will be. 11:31:02

14 Q. So does DSL primarily provide a benefit 11:31:09

15 over distance-based impairments? 11:31:15

16 A. I would say the longer the distance, the 11:31:20

17 more pronounced the benefit. 11:31:23

18 Q. Do you have 1006 in your binder? 11:31:43

19 A. I do. 11:31:50

20 Q. What's the number of 1006? 11:31:51

21 A. US Patent Number -- well, 11:31:56

22 2006/0218593 A1. 11:32:10

1 Q. Is it fair to refer to this as Afshary? 11:32:11

2 A. Yes. 11:32:15

3 Q. Do you know any of the inventors of this 11:32:16

4 patent publication? 11:32:20

5 A. I do not. 11:32:22

6 Q. So Afshary is a coax LAN reference; 11:32:22

7 right? 11:32:30

8 A. Yes. 11:32:32

9 Q. When did you first become exposed to 11:32:33

10 coax cable in your professional career? 11:32:47

11 A. Professional career? 11:32:53

12 Q. I assume you watched television before 11:32:55

13 then? 11:32:58

14 A. Well, no, I was building things, working 11:32:59

15 on things before professional career, but you're 11:33:04

16 limiting it to professional career. 11:33:07

17 I would say my first 11:33:09

18 professional job. 11:33:13

19 Q. Which was? 11:33:14

20 A. Blonder Tongue Laboratories. 11:33:16

21 (Clarification requested by the Court Reporter.) 11:33:20

22 A. Yeah, it's a really weird -- sorry. 11:33:21

1 It's the name of the two founders, 11:33:21
2 B-L-O-N-D-E-R, dash, Tongue, unfortunately like the 11:33:24
3 tongue, T-O-N-G-U-E, Laboratories in Old Bridge, New 11:33:32
4 Jersey. 11:33:40

5 Q. You said you were also building things 11:33:40
6 and working on things before your professional 11:33:45
7 career. 11:33:47

8 Did you ever -- pardon me. 11:33:48

9 Have you ever designed a cable 11:33:50
10 network before your professional career began? 11:33:53

11 A. I built -- I ran cable wiring in my 11:33:57
12 house, but I'm not sure that's what you're 11:34:04
13 referring to. 11:34:08

14 Q. As part of that exercise, did you do 11:34:09
15 anything other than buy commercially available 11:34:12
16 equipment and install it? 11:34:15

17 A. No. 11:34:16

18 Q. So what did you do at Blonder Tongue 11:34:17
19 Labs? 11:34:25

20 A. Well, multiple -- multiple projects. 11:34:26
21 Cable modulators, settop boxes. Blonder Tongue was 11:34:33
22 one of the leading manufacturers of cable television 11:34:39

1 equipment at the time. 11:34:45

2 I was employed as a design engineer, 11:34:49

3 and designing multiple products used in the -- for 11:34:52

4 the cable industry. 11:34:58

5 Q. Who purchased Blonder Tongue settop 11:34:58

6 boxes, cable modulators -- I think those are the 11:35:04

7 only two examples you gave? 11:35:08

8 A. Cable operators. 11:35:10

9 Q. The same cable operators you were 11:35:11

10 talking about before? 11:35:14

11 A. Well, we're going back to the 1970s. 11:35:15

12 Some of the players were different. Generally, it 11:35:19

13 was smaller companies, usually, but many the same. 11:35:22

14 Q. Those settop boxes had a coax cable 11:35:30

15 input; is that right? 11:35:49

16 A. They -- often they did. Some I worked 11:35:50

17 on had coax to the TV, but one of the projects I 11:35:59

18 worked on was a settop box that actually received a 11:36:06

19 broadcast signal. They were one of the leaders in 11:36:12

20 wireless cable. So I also worked on -- it was an 11:36:17

21 adaptation of their cable box. So I worked on that 11:36:20

22 as well as their traditional cable box that would go 11:36:25

1 in the home. 11:36:29

2 I also worked on headend equipment 11:36:31

3 that would go in the rack at the cable headend. 11:36:34

4 Q. Who was distributing wireless cable 11:36:37

5 television in the '70s? 11:36:41

6 A. It was not being distributed. It was 11:36:43

7 brand new. It's a little bit of a sad story because 11:36:48

8 it was launched wireless from the World Trade 11:36:52

9 Center, which no longer exists. 11:36:57

10 But Blonder Tongue was -- I don't 11:37:01

11 want to say experimenting because it was 11:37:07

12 commercially successful, a wireless cable broadcast 11:37:09

13 from the World Trade Center to the greater New York 11:37:13

14 area. 11:37:14

15 I was involved in both some of the 11:37:15

16 cable headend equipment that went into that network 11:37:19

17 at the headend as well as design of the settop box 11:37:24

18 that connected to your television. 11:37:30

19 Q. So what distinguished that wireless 11:37:32

20 cable broadcast signal from the analog TV signal 11:37:36

21 that was available at the time that could be 11:37:43

22 captured with the rabbit ears or the other flat 11:37:45

1 antenna? 11:37:49

2 A. Paid television, X-rated movies. Sorry. 11:37:50

3 Q. You said paid, paid television? 11:37:56

4 A. Paid. So, in other words, you would 11:38:04

5 have to subscribe to it. It was not offered for 11:38:05

6 free. You had to buy a subscription. I obviously 11:38:08

7 had no involvement on the marketing. I was 11:38:11

8 designing the product. 11:38:14

9 Q. Are you familiar with coax cable 11:38:54

10 splitters? 11:38:56

11 A. Yes. 11:38:57

12 Q. What do they do? 11:38:57

13 A. They, in simplest terms, create multiple 11:38:58

14 connections from one cable, or multiple cables from 11:39:05

15 one cable. 11:39:11

16 Q. So they take a signal and divide it 11:39:16

17 between multiple outputs? 11:39:19

18 A. Inputs and outputs, if it's 11:39:23

19 bidirectional. Yes, correct. 11:39:26

20 Q. The other direction to the input would 11:39:27

21 be two incoming signals that go -- 11:39:29

22 A. If it's bidirectional, yes. 11:39:31

1 Q. Are most splitters bidirectional? 11:39:32

2 A. Today, I believe they are. In very 11:39:35

3 early days, they -- some of them may not have been, 11:39:37

4 but I'd say almost 100 percent today. 11:39:41

5 Q. How about in approximately 2001? 11:39:43

6 A. Generally, yes. The way they're 11:39:49

7 designed, the balance, are generally bidirectional. 11:39:54

8 Q. You have Afshary open; right? 11:39:57

9 A. I do. 11:39:59

10 Q. Are you on the front page? Perfect. 11:39:59

11 A. Yes. 11:40:02

12 Q. So Afshary generally describes multiple 11:40:03

13 splitters within the network that allow a TV signal 11:40:08

14 coming in from the cable line via that tap at the 11:40:16

15 bottom of the image to arrive at multiple different 11:40:21

16 rooms in the house; is that a fair general 11:40:26

17 characterization of how that works? 11:40:29

18 A. Yes. 11:40:30

19 Q. So we've got different lines labeled 24 11:40:30

20 that go into a variety of different cable LAN 11:40:36

21 adapters in different rooms? 11:40:39

22 A. Yes. 11:40:41

1 Q. Does Afshary describe any sort of 11:40:41
2 synchronization mechanism? 11:40:50

3 A. Synchronization between? 11:40:52

4 Q. Cable LAN adapters. 11:40:56

5 A. Can you define what you mean by 11:40:58
6 "synchronization"? You don't mean just talking to 11:41:13
7 each other? I'm not sure when you say 11:41:14
8 "synchronization" what specifically you're -- what 11:41:16
9 technical activity you're referring to because 11:41:20
10 that's a very broad term. 11:41:23

11 Q. How would you describe device 11:41:25
12 synchronization on a network? 11:41:29

13 A. Timing control. 11:41:30

14 Q. Let's use that. 11:41:32

15 A. Which would be synchronous 11:41:34
16 communications. 11:41:36

17 Q. We'll use that understanding, then, yes. 11:41:36
18 Same one. 11:41:38

19 A. Okay. So your question was... 11:41:46

20 Q. Does Afshary describe any sort of 11:41:48
21 synchronization mechanism? 11:41:54

22 A. Well, there's a lot to read through, 11:41:55

1 but... 11:42:07

2 So there is some discussion of 11:43:59

3 isochronous and asynchronous data, but generally, if 11:44:05

4 you're asking if the LANs are synchronous with each 11:44:08

5 other, I don't think that's the context of the 11:44:13

6 patent. 11:44:16

7 Q. When you say the LANs, plural, which 11:44:16

8 LANs are you referring to? 11:44:20

9 A. Oh, like various -- the cable LAN 11:44:21

10 adapters shown in figure -- in the Figure 1. 11:44:24

11 Q. Sorry. Just so we're clear, you agree 11:44:37

12 that there's not a synchronization method described 11:44:40

13 in Afshary that provides synchronization between the 11:44:46

14 different cable LAN adaptors of Afshary; right? 11:44:52

15 (Clarification requested by the Court Reporter.) 11:44:52

16 Q. -- to ensure synchronization between the 11:45:02

17 four different cable LAN adapters of Figure 1 of 11:45:06

18 Afshary? 11:45:10

19 A. I don't see it in the time domain. I 11:45:11

20 guess you could perhaps say in the frequency domain 11:45:15

21 because they're placing the LAN signals at different 11:45:17

22 frequencies, but... 11:45:20

1 Q. Where does Afshary explain that the 11:45:26
2 different cable LAN adapters are placing the LAN 11:45:28
3 signals at different frequencies? 11:45:34

4 A. Well, Figure 3, for instance, shows 11:45:36
5 placing the -- what's called adapter operating 11:45:39
6 frequency at a different bandwidth from the main 11:45:46
7 frequency spectrum. 11:45:54

8 (Clarification requested by the Court Reporter.) 11:44:52

9 A. -- M-A-I-N frequency spectrum. 11:45:56

10 Q. Figure 3 is not describing the frequency 11:45:57
11 that is used by different LANs -- or excuse me, 11:46:01
12 different cable LAN adapters, is it? 11:46:04

13 It's instead showing the operating 11:46:12
14 frequency of the cable LAN adapters? 11:46:18

15 A. I'm not sure. Honestly, I'm not sure 11:46:26
16 what your question was. 11:46:27

17 Q. Sure. 11:46:28

18 You had said that Afshary describes 11:46:29
19 placing the LAN signals at different frequencies. 11:46:34

20 The LAN signals there, I assume you meant the 11:46:40
21 signals that originate at the different cable LAN 11:46:43
22 adapters. Is that right? 11:46:47

1 through the patent to find that. 11:47:53

2 But just looking at the diagram, I 11:47:57

3 don't see where you couldn't put one LAN at one band 11:47:59

4 and one at another. But what they actually verbally 11:48:03

5 say, I'd have to spend the time to read through and 11:48:07

6 see what examples they give. 11:48:11

7 Q. I'm interested in what Afshary suggests 11:48:16

8 to you. 11:48:18

9 So I'm wondering if you have an 11:48:19

10 opinion about whether or not there is anything in 11:48:20

11 Afshary that describes an assignment of a frequency 11:48:22

12 to a given cable LAN adapter? 11:48:26

13 A. Assignment by? 11:48:30

14 Q. So this whole thing was predicated on a 11:48:36

15 question by me about whether or not there was 11:48:38

16 synchronization or a controller in Afshary. You 11:48:40

17 seem to think that there was, and I'm trying to 11:48:45

18 figure out where the basis of that comes from. 11:48:47

19 A. No, I believe I said that I saw some 11:48:49

20 reference to synchronous communications. I wasn't 11:48:51

21 referring to some master controller who was telling 11:48:54

22 everybody what to do. 11:48:57

1 Okay. Sorry. Can you repeat the 11:48:59
2 question. I looked through -- 11:53:03

3 Q. So the last question I asked was 11:53:06
4 effectively: This whole thing was predicated on a 11:53:17
5 question by me about whether or not there was 11:53:20
6 synchronization or a controller in Afshary. You 11:53:23
7 seem to think there was, and I'm trying to figure 11:53:27
8 out where that basis comes from. 11:53:30

9 A. Well, I didn't say a controller. I said 11:53:32
10 that there was discussion of, at one point in the 11:53:34
11 claims, of synchronous communications. In other 11:53:38
12 words, it said a -- in Claim 33, "an interface core 11:53:44
13 to communicate with the universal client interface 11:53:49
14 with a burst controller." (As read.) 11:53:52

15 And then there's some -- there's 11:53:55
16 some discussion in Claim 34, "...the burst 11:54:03
17 controller supports isochronous and asynchronous 11:54:07
18 data." (As read.) So that's what I'm referring to. 11:54:13

19 Q. I think we covered this in the 11:54:20
20 beginning, but I just want to make sure. So I 11:54:22
21 apologize if you've already answered this, but 11:54:24
22 Afshary is a coax network; right? 11:54:26

1 A. That's correct. 11:54:29

2 Q. It operates at -- well, let me ask a 11:54:30

3 better question. 11:54:44

4 What -- yeah, what carrier 11:54:44

5 frequencies does Afshary's coax network operate 11:54:47

6 over? 11:54:51

7 A. Well, I think it can operate on any 11:54:51

8 frequency. They show some examples of frequency, 11:54:56

9 but they also state that the frequency could be 11:55:03

10 different. 11:55:07

11 Q. Does coax generally support higher 11:55:10

12 frequency communication? 11:55:13

13 A. When you say higher, can you give me a 11:55:14

14 little more context. 11:55:18

15 Q. In your opinion, is it generally 11:55:19

16 understood that coax networks support higher 11:55:22

17 frequency communication? 11:55:24

18 A. Well, higher than -- higher than what? 11:55:25

19 I'm not trying to be cute, but I mean higher than -- 11:55:29

20 can you give me a number? 11:55:32

21 Q. Other wired communications. 11:55:33

22 A. It's not higher than fiber optics. It's 11:55:36

1 higher than power line communications. 11:55:51

2 Q. As of approximately 2000, do you have an 11:56:03
3 understanding of the frequency range that was 11:56:14
4 assigned to cable television service? 11:56:16

5 A. Boy, that varied. That varied 11:56:21
6 throughout the country. And also varied as to how 11:56:24
7 old or new the cable system was. So it was all over 11:56:30
8 the map in terms of where the -- if you're asking 11:56:36
9 where the upper limit was to the home network, it 11:56:41
10 was really all over the map, and varied quite a lot, 11:56:47
11 and by community, and also could be by home, if your 11:56:53
12 home was recently rewired. 11:56:56

13 So it's difficult -- I mean, it's a 11:56:58
14 very, very difficult question to pin down because 11:57:02
15 it's just so variable. 11:57:05

16 Q. Do you agree that coax cables are a very 11:57:09
17 clear, clean medium? 11:57:19

18 A. Well, theoretically they can be, but in 11:57:21
19 practice, there are significant problems with coax, 11:57:24
20 as they are with all mediums. But in particular, 11:57:30
21 coax has a number of problems in practice. 11:57:34

22 Q. Would you agree that coax cables are 11:57:38

1 particularly length-constrained as it results to 11:57:41
2 signal attenuation? 11:57:45

3 A. All cables are. All wire communications 11:57:46
4 is length-limited, so the answer would be yes. 11:57:51

5 Q. In Figure 1 -- so element 15 is a tap 11:57:56
6 splitter off of a cable line; is that right? 11:58:14

7 A. Yes. 11:58:20

8 Q. Takes a signal from the out-of-home 11:58:21
9 cable network, and allows that to go into the home 11:58:24
10 depicted in Figure 1? 11:58:28

11 A. Yes, presumably. 11:58:29

12 Q. That signal that goes into splitter 22, 11:58:31
13 the same signal that goes into splitter 22, comes 11:58:40
14 out of splitter 22 on those three lines; is that 11:58:43
15 right? 11:58:47

16 A. Yes. 11:58:47

17 Q. Then that same signal that goes into 11:58:51
18 splitter 38 comes out of splitter 38 on those next 11:58:54
19 two lines? 11:58:58

20 A. Yes. 11:58:59

21 Q. Do you have an opinion about whether or 11:58:59
22 not the splitters in Afshary are bidirectional or 11:59:07

1 single-directional? 11:59:10

2 A. Well, say -- it's a cable LAN, so LAN 11:59:12

3 means local area network, which implies 11:59:23

4 two-directional. The only caveat I would put is if 11:59:28

5 that was an old home with old splitters, maybe they 11:59:36

6 might work better in one direction than the other, 11:59:39

7 possibly. 11:59:42

8 But LAN would imply bidirectional, 11:59:45

9 so that would imply, by definition, that the 11:59:50

10 splitter would have to work over multiple 11:59:55

11 directions. 12:00:01

12 Q. Does Afshary describe a data throughput 12:00:02

13 rate? 12:00:10

14 A. Well, I do see some reference -- just 12:00:11

15 looking through, I see some references to data 12:00:39

16 rates. 12:00:43

17 Q. Is that tied to anything in Afshary or 12:00:46

18 simply the general QPSK modulation data rates? 12:00:49

19 A. Well, I see that QPSK data rates. I 12:00:53

20 also see a reference to MPEG-2 which implies an 12:00:57

21 inherent data rate of MPEG-2, and there may be more 12:01:03

22 references, but those jump out at me. 12:01:08

1 Q. So Paragraph 27 of Afshary suggests that 12:01:13
2 coax cable permits speeds of greater than 100 12:01:17
3 megabits per second. 12:01:24

4 Do you see that? 12:01:24

5 A. Yes. 12:01:24

6 Q. Is that consistent with your 12:01:27
7 understanding of coax data rates that were available 12:01:28
8 as of approximately 2000? 12:01:34

9 A. When you say typical, typical of what 12:01:37
10 type of a network? 12:02:00

11 Q. Coax cable. 12:02:02

12 A. Well, I mean, ethernet is -- you know, 12:02:04
13 there's 10 megabit ethernet, these 100 megabit 12:02:09
14 ethernet. 12:02:15

15 Back in -- can you repeat your 12:02:16
16 question because that's -- that's -- I'm not sure 12:02:20
17 what you're asking. 12:02:22

18 Q. Is Afshary's statement that cable -- 12:02:24
19 pardon me. 12:02:28

20 Is Afshary's statement that coax 12:02:28
21 cable permits speeds of greater than 100 megabits 12:02:31
22 per second consistent with your understanding of 12:02:35

1 coax data rates that were available as of 12:02:38
2 approximately 2000? 12:02:40

3 A. Well, there's nothing in the coax itself 12:02:41
4 that limits data rate. That's first thing. There's 12:02:44
5 no -- no matter what coax you look up, they don't 12:02:50
6 rate them by data rate. That has to do with how you 12:02:52
7 modulate it. 12:02:55

8 So there's no reason you couldn't 12:02:56
9 send 100 megabit. That said, there wasn't widely 12:02:59
10 use of those type of speeds in 2000. You know, that 12:03:04
11 would be considered a lot higher than today we would 12:03:12
12 consider that not so high. 12:03:16

13 Q. Is Afshary a single carrier reference? 12:03:18

14 A. Well, there could be -- there could be 12:04:06
15 multiple LAN signals going on because they show 12:04:22
16 multiple LANs, but generally, it refers to a -- the 12:04:27
17 context is -- on each of those LAN connections, the 12:04:34
18 context is a single carrier. 12:04:37

19 Q. IS single carrier modulation still used 12:04:41
20 today? 12:04:45

21 A. Yes, of course. 12:04:49

22 Q. In what? 12:04:49

1 A. Well, broadcast has gone to HDTV, and 12:06:05
2 modern HDTV, not just in this country, I'm pretty 12:06:10
3 sure all over the world, except maybe some third 12:06:15
4 world countries where they're using old equipment, 12:06:18
5 it's all OFDM on modern broadcast television. 12:06:21

6 Q. Then you said, "Single carrier is still 12:06:27
7 prevalent everywhere." Why would one use single 12:06:33
8 carrier today? 12:06:38

9 A. Simplicity. 12:06:39

10 Q. What about single carrier achieves that 12:06:40
11 simplicity? 12:06:49

12 A. I'm sorry. Can you repeat the -- what? 12:06:51

13 Q. What about single carrier achieves that 12:06:53
14 simplicity? 12:06:56

15 A. Well, it's based on technology we've 12:06:57
16 known for 100 years. So it's easy to deploy and 12:07:00
17 build on, whether we're talking about CB radio, 12:07:06
18 is -- you asked for examples, is single-carrier. 12:07:13
19 Most ham radio is still single carrier. Most 12:07:17
20 airport, airplane communications is single carrier. 12:07:25

21 Police and fire, the police that 12:07:42
22 were at the event yesterday on walkie-talkies, 12:07:48

1 single carrier. 12:07:52

2 Q. Would you agree that radio signal 12:08:13

3 interference is frequency dependent? 12:08:18

4 A. Boy, that's -- that's a -- when you say 12:08:21

5 frequency-dependent, are you saying the frequency 12:08:29

6 causes the interference? 12:08:33

7 Q. I think so. 12:08:36

8 A. Yeah. Frequency itself does not cause 12:08:38

9 interference. Interference causes interference. 12:08:41

10 Q. So that could be a hard one for me to 12:08:44

11 ask a follow-up on, but I will try it anyways. 12:08:46

12 What causes interference? 12:08:50

13 A. Well, it could be -- I put it into two 12:08:52

14 classes, external interference and 12:08:56

15 self-interference, and they both have degrading 12:09:00

16 effects on the signal. 12:09:01

17 Q. So external interference, how does 12:09:02

18 external interference degrade a signal? 12:09:07

19 A. Noise ingress. Radio signals can 12:09:10

20 actually interfere into -- into wired networks, both 12:09:16

21 coax and twisted pair can both be susceptible to -- 12:09:24

22 just to give you an example, a ham radio could -- 12:09:28

1 just giving you an example, could create 12:09:31
2 interference. 12:09:33

3 Old cars, ignition noise can create 12:09:34
4 interference. Believe it or not, the sun, sun spot 12:09:39
5 storms can -- we just went through a solar storm -- 12:09:45
6 sun spot storms can -- I'm not trying to be out 12:09:50
7 there, can cause external interference. 12:09:54

8 So there's many sources. Also other 12:09:57
9 signals that are just somehow get into that cable 12:10:00
10 can -- they just -- that's just the source of 12:10:07
11 interference. 12:10:11

12 Q. What does that actually -- that being 12:10:11
13 the interference, what does the interference 12:10:14
14 actually do to the signal? 12:10:17

15 A. Degrades it. 12:10:19

16 Q. How? 12:10:21

17 A. Well, right off the bat, it lowers the 12:10:21
18 signal-to-noise ratio, so whatever your signal was, 12:10:26
19 in communications, we keep parameter, we always look 12:10:34
20 at a signal-to-noise ratio, so right off, those are 12:10:36
21 creating noise. 12:10:41

22 But worse than that, if it's on the 12:10:42

1 same -- if it's on the same frequency, it could 12:10:44
2 actually cause intersymbol interference if it's 12:10:49
3 data. If it's strong enough, it could cause 12:10:57
4 overloading of devices on the network. 12:11:02

5 Generally, it's referred to as noise 12:11:07
6 ingress, and it's a problem on all -- all types of 12:11:09
7 wired networks. 12:11:17

8 Q. Is DMT a duplexed communication 12:11:54
9 method -- communication technique? Excuse me. 12:12:03

10 A. You mean is it two-way? 12:12:03

11 Q. Yes. 12:12:05

12 A. Yes. It's designed to be bidirectional. 12:12:06
13 I mean almost all data communications would be 12:12:10
14 bidirectional. 12:12:13

15 Q. Have you ever heard of a MARC record? 12:12:25
16 M-A-R-C. 12:12:28

17 A. M-A-R-C record? I don't recall it 12:12:28
18 offhand. If you showed me a context referring to 12:12:34
19 it, I might recognize it, but offhand, I don't. I 12:12:37
20 don't recognize it. 12:12:45

21 Q. Do you know a gentleman named Tim 12:12:45
22 Williams? 12:12:47

1 A. Boy, it's a common name. It doesn't 12:12:48
2 jump out at me. 12:12:54

3 Q. Are you aware that there are multiple 12:12:55
4 IPR proceedings challenging the same '518 patent? 12:12:59

5 A. No. 12:13:02

6 Honestly, I don't discuss those kind 12:13:07
7 of things with -- it hasn't come up. 12:13:09

8 Q. I want to ask you a couple of questions 12:13:16
9 about your declaration itself. Give me just a 12:13:17
10 second. 12:13:21

11 Can you go to Paragraph -- it's 12:13:26
12 going to be page 33, Paragraph 69 of your 12:13:28
13 declaration. 12:13:32

14 A. And FYI, I think I'm close to needing a 12:13:43
15 break. I have postponed it for a while. 12:13:48

16 MR. HALVERSON: Okay. It's a good 12:13:51
17 time to take a break. 12:13:54

18 (RECESS, 12:13 p.m. - 12:49 p.m.) 12:13:57

19 BY MR. HALVERSON: 12:49:29

20 Q. All right. We were at page 33, 12:49:30
21 Paragraph 69. Can we go back to your declaration. 12:49:32

22 A. Okay. Did you say page 69? 12:49:35

1 Q. Paragraph 69, page 33. 12:49:40

2 MR. QUALEY: I thought it was 12:49:47

3 page 32. 12:49:49

4 MR. HALVERSON: It starts on 32. My 12:49:49

5 question is on 33. 12:49:51

6 A. Okay. 12:49:57

7 Q. Next page. There's a block quote there. 12:49:58

8 Do you see that? 12:50:03

9 MR. QUALEY: Just one second, I'm 12:50:06

10 sorry. 12:50:07

11 (Off the record.) 12:50:09

12 (RECESS, 12:50 p.m. - 12:52 p.m.) 12:51:33

13 BY MR. HALVERSON: 12:52:46

14 Q. So there's a block quote there. 12:53:09

15 Do you see that? 12:53:11

16 A. Are you talking about the middle of 12:53:12

17 page 33, or... 12:53:17

18 Q. Yes. 12:53:19

19 A. Okay. 12:53:19

20 Q. It's talking about some prior art 12:53:21

21 references that are referenced in the '518 patent? 12:53:24

22 A. Yes. 12:53:27

1 Q. Is that right? 12:53:28

2 A. Yes. 12:53:28

3 Q. You're not relying on any 12:53:29

4 applicant-admitted prior art as part of your 12:53:36

5 obviousness theories, are you? 12:53:40

6 A. So in other words, what you're asking is 12:53:42

7 the patents that were cited in the '518 patent as 12:53:49

8 prior art, am I relying on those? 12:53:54

9 Q. As part of your theory of 12:53:56

10 unpatentability in your declaration. 12:53:59

11 A. I don't believe my exhibits were those. 12:54:01

12 I can go back and check to make sure, but I don't -- 12:54:09

13 I don't believe -- so I think you're asking is, was 12:54:20

14 your prior art cited in my declaration, and -- 12:54:24

15 honestly, I don't recall if it's in there or not. 12:54:31

16 That -- to answer your question. I don't think so, 12:54:37

17 but I don't want to say 100 percent. 12:54:39

18 Q. Have you read those two patents? 12:54:41

19 A. I don't recall recently reading them, 12:54:42

20 but I think at one point in the beginning of my 12:54:49

21 work, I did. 12:54:51

22 Q. But not in preparation for today? 12:54:52

1 A. No, not in preparation for today. 12:54:55

2 Q. Okay. Now, you say that, "...the 12:54:58

3 '518 patent admits that several prior art references 12:55:12

4 disclosed multi-carrier modulation with bit 12:55:15

5 loading." 12:55:15

6 Do you see that? 12:55:20

7 A. Yes. 12:55:20

8 Q. Do you know whether or not either one of 12:55:20

9 those patents describe that in a coaxial network? 12:55:22

10 A. I'd have to look at the patents to see 12:55:24

11 what the network was. If you want me to look at 12:55:26

12 them, I'd be glad to tell you what the networks are. 12:55:28

13 Q. Can you go back to Mirfakhraei for me, 12:55:33

14 Exhibit 1007. 12:55:58

15 A. Do I need to keep this page open for any 12:56:00

16 reason? Thank you. 12:56:03

17 Q. Although, you may need to open up a 12:56:32

18 different page in there. So we're going to ask a 12:56:35

19 couple of questions that are going to involve a few 12:56:41

20 other places. 12:56:43

21 So if you could open up -- keep that 12:56:44

22 to Mirfakhraei. Then open up your declaration to 12:56:47

1 the beginning of your discussion of Claim 1, which 12:57:07
2 I'm trying to pull up, happens at page 118 -- or 12:57:14
3 excuse me, Paragraph 118. 12:57:17

4 A. Page 61. 12:57:27

5 Q. That's right. 12:57:30

6 So Subheading A. 12:57:35

7 Do you see that there? 12:57:37

8 A. Yes. 12:57:39

9 Q. I believe that what Subheading A is 12:57:39
10 describing is the prior art that you are contending 12:57:42
11 renders obvious Claims 1 through 4; is that right? 12:57:47

12 A. That's correct. 12:57:51

13 Q. So as part of that, you're not relying 12:57:52
14 on any applicant-admitted prior art; is that right? 12:57:54

15 A. Well, you're asking a legal question. 12:58:02
16 Obviously, I read everything that I cite in my 12:58:07
17 declaration, but in the statement I make there, it 12:58:11
18 asks for in view of Mirfakhraei, I'm saying those, 12:58:17
19 too, are grounds for obviousness. 12:58:25

20 I'm not sure on legally, if I can't 12:58:27
21 say that I have a whole bunch of other -- of other 12:58:31
22 prior art that I looked at. 12:58:37

1 But I mean in this one section, what 12:58:43
2 I'm saying is Afshary in view of Mirfakhraei 12:58:45
3 referred Claims 1 through 4 obvious. 12:58:52

4 Sorry. I'm not a lawyer, so I don't 12:58:57
5 know how to legally say that I didn't read the other 12:59:00
6 patents at some point. 12:59:02

7 Q. Can you go to Paragraph 128 for me. Let 12:59:03
8 me know when you're there. 12:59:15

9 A. Yeah. I'm here. 12:59:16

10 Q. The second sentence talks about some 12:59:17
11 disclosures of Mirfakhraei. 12:59:18

12 Do you see that? 12:59:19

13 A. Single carrier modulation protocols, 12:59:21
14 DMT, OFDM provides advantages. Are you talking 12:59:31
15 about that? 12:59:35

16 Q. You say "more reliable communications." 12:59:35

17 Do you see that part? 12:59:38

18 A. Yes. 12:59:39

19 Q. How did you ascertain what was more 12:59:39
20 reliable? 12:59:44

21 A. Better bit error rate. 12:59:54

22 Q. Better bit error rate? 12:59:56

1 transistors, are you talking about dollars, are you 01:01:27
2 talking about time to market and engineering 01:01:30
3 development. 01:01:33

4 Q. You had used the word "simple" when you 01:01:35
5 described why people were still using single-carrier 01:01:37
6 communications. 01:01:41

7 A. Yes. 01:01:41

8 Q. So my understanding is the opposite of 01:01:42
9 simple is complex. That's all I mean by complex. 01:01:45

10 A. Well, and remember, I was also referring 01:01:48
11 to the simple in the sense that there's 100 years of 01:01:50
12 existing stuff to bear on for a single-carrier, so 01:01:53
13 that's in a sense, simple, too, because there's 100 01:01:57
14 years of knowledge instead of probably -- probably 01:02:00
15 150 years of knowledge instead of 20 or 30 years of 01:02:04
16 knowledge. 01:02:07

17 So what was your question again? 01:02:08
18 I'm sorry. 01:02:12

19 Q. Just whether or not multi-carrier 01:02:18
20 communications are more complex than single-carrier? 01:02:21

21 A. Yeah, I would say not necessarily so. 01:02:23

22 Q. So you used the phrase harsh 01:02:25

1	communication environment or harsh environments to	01:02:58
2	describe coax cable infrastructure a number of times	01:03:01
3	in your declaration; is that right?	01:03:05
4	A. Can you show me one of the examples?	01:03:06
5	Q. Sure.	01:03:08
6	A. So I have the context.	01:03:12
7	Q. Give me just a second.	01:03:14
8	It first appears in Paragraph 54 on	01:03:16
9	page 23. Same thing, Paragraph 127, 139, 141, 146.	01:03:20
10	A. Okay.	01:03:37
11	Q. All saying roughly the same thing. Coax	01:03:37
12	can be a harsh environment.	01:03:41
13	A. Yes.	01:03:43
14	Q. Which one are you looking at right now?	01:03:43
15	A. I'm looking at 54.	01:03:45
16	Q. So in 54, you cite to Exhibit 1018; is	01:03:48
17	that right?	01:03:53
18	A. Yes.	01:03:54
19	Q. You have 1018 in front of you?	01:03:56
20	A. Let me call it up.	01:03:58
21	Q. It's the Jacobsen paper.	01:04:00
22	A. Yes. Yes, I have it.	01:04:03

1 Q. You cite to 305 and 306 at Paragraph 54, 01:04:11
2 which correspond to the first and second page of 01:04:15
3 1018; is that right? 01:05:00

4 A. I have it. 01:05:01

5 Q. Is that right? 305 and 306 that you 01:05:02
6 cite to correspond to the first and second page 01:05:06
7 of 1018? 01:05:09

8 A. Yes. 01:05:10

9 Q. So what is it on pages 305 and 306 01:05:10
10 of 1018 that suggests the cable communication medium 01:05:15
11 can be a harsh environment? 01:05:18

12 A. Okay. Do you want me to just call out a 01:05:20
13 couple of citations that she makes? 01:05:49

14 Q. Yeah. Sure. Which parts? And if you 01:05:56
15 could tell me what page they're on. 01:05:58

16 A. Yeah. Okay. Well, first page, 305, 01:06:00
17 there are several electrical transmission problems 01:06:03
18 that must be overcome before these services can be 01:06:05
19 supplied reliably over CATV networks. 01:06:08

20 Q. Sorry. There's a lot of words on 305. 01:06:12
21 Where in 305 are you reading right now? 01:06:15

22 A. Bottom of the paragraph under 01:06:17

1 introduction. 01:06:21

2 Q. Okay. 01:06:31

3 What kind of electrical transmission 01:06:32

4 problems does Jacobson refer to in this paper? 01:06:34

5 A. Well, in that sentence, she says 01:06:40

6 several. I can go further, if -- I mean, you're not 01:06:44

7 asking my own personal experience, right, you're 01:06:50

8 asking for Jacobson and her references, so I'd have 01:06:52

9 to read further to give you specific examples what 01:06:55

10 she cites just right there, several problems. 01:06:58

11 I can read further, though, because 01:07:02

12 I believe she mentions it often. 01:07:04

13 Q. Sure. 01:07:07

14 So what I'm curious about is you 01:07:07

15 used the phrase "harsh environment" -- 01:07:10

16 A. Yes. 01:07:12

17 Q. -- to describe coax cables -- 01:07:12

18 A. Right. 01:07:14

19 Q. -- and you cite to this paper. 01:07:15

20 A. Correct. 01:07:17

21 Q. She doesn't use the word "harsh 01:07:17

22 environment." So I'm curious as to why you use the 01:07:19

1 word "harsh environment." 01:07:23

2 A. I guess personal, you know, everyone has 01:07:24

3 a way of writing things -- 01:07:26

4 Q. So was it -- 01:07:27

5 A. -- that's, you know, and it's an 01:07:28

6 adjective, so... 01:07:29

7 Q. So was it the several electrical 01:07:31

8 transmission problems that suggests to you that coax 01:07:33

9 cable is a harsh environment? 01:07:37

10 A. Well, I -- that's one. As I go forward 01:07:38

11 and read, I can -- "...CATV networks can also have 01:07:44

12 high-frequency attenuation reduced by the 01:07:48

13 installation of equalizing diplex amplifiers. 01:07:50

14 Even after such installation, the 01:07:54

15 network operator finds only some channels are 01:07:56

16 available for new digital services." (As read.) 01:07:59

17 Q. So high-frequency attenuation suggests a 01:08:09

18 harsh communication environment? 01:08:13

19 A. Yes. 01:08:14

20 Q. Okay. 01:08:14

21 Is there anything else that Jacobson 01:08:15

22 that suggests a harsh communication environment? 01:08:17

1 A. Well, again, I'm not trying to be 01:09:44
2 all-inclusive. Just giving you examples, on 01:09:48
3 page 306, "A second source of degradation is 01:09:51
4 interference from other signals. For example, leaks 01:09:53
5 in a CATV network caused by poorly shielded 01:09:57
6 computer -- I'm sorry, consumer devices or system 01:10:01
7 hardware." (As read.) 01:10:04

8 Then she goes on to mention ham 01:10:05
9 radio signals entering the CATV system, and leaky 01:10:09
10 CATV networks. "As a result, the received signal is 01:10:17
11 degraded." 01:10:21

12 Q. Is there anything else on page 306 that 01:10:33
13 suggests a harsh environment? 01:10:35

14 A. Sure. Third, that big paragraph down -- 01:10:37
15 well, let's just take the end of the second 01:11:14
16 paragraph. 01:11:16

17 "...an effective digital 01:11:16
18 transmission scheme must be able to maintain a 01:11:19
19 desired performance level in the presence of 01:11:22
20 interfering signals." 01:11:25

21 So that just speaks to the same 01:11:27
22 degradations. 01:11:29

1 Q. Anything else? 01:11:30

2 A. Probably. I can go back and read from 01:11:32
3 the beginning of 306, but I mean, I think there's 01:11:36
4 several citations that she makes. 01:11:39

5 Q. So, so far, you've identified the 01:11:42
6 interference? 01:11:44

7 A. Yes. 01:11:45

8 Q. You've identified ISI, which is internal 01:11:46
9 interference -- 01:11:53

10 A. Yes. 01:11:53

11 Q. -- as compared to the interference on 01:11:53
12 306, which was external interference? 01:11:55

13 And you've identified high-frequency 01:11:59
14 attenuation? 01:12:03

15 A. Leaky networks, ham signal interference. 01:12:03

16 Q. Leaky networks and ham signal 01:12:08
17 interference are both external interference; right? 01:12:10

18 A. Leaky -- leaky would be, yes, external 01:12:15
19 interference leaking through. 01:12:21

20 Q. Okay. 01:12:24

21 So in addition to external 01:12:25
22 interference, ISI, and high-frequency attenuation, 01:12:28

1 is there anything else in 305 and 306 that suggest 01:12:32
2 to you that coax cable communication is a medium 01:12:36
3 that is a harsh environment? 01:12:41

4 A. Well, in terms of internal interference, 01:12:43
5 and going back to page 305, again, she mentions 01:13:17
6 taps, "...amplifiers, and splitters," so that's a 01:13:24
7 lot of items, "can all cause signals to be reflected 01:13:26
8 at their insertion points." 01:13:30

9 I would, in my experience, I say 01:13:32
10 that's very significant. 01:13:37

11 Q. So those are just things that cause ISI; 01:13:41
12 right? 01:13:44

13 A. ISI and other problems. 01:13:44

14 Q. What are these other problems? 01:13:46

15 A. Well, you could have -- you could have 01:13:48
16 ghosting. I mean, in general, ISI refers to 01:13:53
17 intersymbol interference and that means higher bit 01:13:57
18 error rates. So, I mean I could say higher bit 01:14:01
19 error rate, but that's the culmination of all 01:14:03
20 impairments, ultimately, affect bit error rate. 01:14:07

21 But it's significant, also, in that 01:14:11
22 these devices she mentioned, they don't get better 01:14:16

1 over time, they get worse. 01:14:19

2 So if they have problems, at some 01:14:21

3 point you're working in the system a year later, 01:14:25

4 there are going to be worse problems, so they 01:14:28

5 degrade over time. 01:14:30

6 Q. So of those, what is unique to a coaxial 01:14:35

7 cable communication medium? 01:14:41

8 A. Boy, I'm trying to understand. 01:14:44

9 So you're saying what is unique 01:14:46

10 about coax? 01:14:47

11 Q. No. So you've identified internal 01:14:48

12 interference, ISI. You've identified high-frequency 01:14:52

13 attenuation. 01:14:57

14 A. Yes. 01:14:57

15 Q. And you've identified external 01:14:58

16 interference. 01:15:00

17 A. Yes. 01:15:00

18 Q. Of those, I'm curious, which ones are 01:15:01

19 unique to a coaxial cable communication medium? 01:15:03

20 A. Well, I believe they can occur to any 01:15:07

21 medium. 01:15:12

22 Q. So it's not that coax can be a harsh 01:15:13

1 environment and other mediums are better 01:15:15

2 environments, it's just that coax and other mediums 01:15:28

3 are all harsh environments? 01:15:20

4 A. I would say the latter part of what you 01:15:22

5 said is what I would also say, if that makes any 01:15:24

6 sense in my answer. Sorry. 01:15:31

7 Q. Does multi-carrier communication always 01:16:19

8 improve data throughput? 01:16:23

9 A. As compared to? 01:16:26

10 Q. Single carrier. 01:16:27

11 A. Single carrier. Well, it's how it's 01:16:30

12 implemented; right? If you take advantage of 01:16:33

13 multi-carrier, it should result in advantage. So I 01:16:37

14 would say yes with the caveat of how it's designed 01:16:44

15 and implemented. 01:16:47

16 Q. So the implementation of that 01:16:54

17 multi-carrier communication method is important? 01:16:56

18 A. Well, implementation of any technology 01:17:04

19 is important to do it correctly, so yes. 01:17:06

20 Q. You offer a number of opinions about 01:17:10

21 predictable results. 01:17:56

22 Does that ring a bell? 01:17:57

1 A. Can you reference me, so -- where I have 01:17:59
2 cited that? By the way, are we done with -- 01:18:03

3 Q. We are done with Jacobson right now, 01:18:06
4 yes. 01:18:09

5 A. Okay. Thank you. 01:18:10

6 Q. Let's find the first instance. I think 01:18:11
7 the first actual opinion of unpredictable results is 01:18:24
8 on page 82, Paragraph 145. 01:18:27

9 Do you see "predictable results" 01:18:43
10 there at the bottom? 01:18:44

11 A. Yes. The last sentence. 01:18:53

12 Q. Okay. 01:19:00

13 What did you do to come to your 01:19:00
14 conclusion that any result would be predictable? 01:19:02

15 A. Well, I believe by predictable results, 01:19:09
16 what I was referring to is the benefit of adding bit 01:19:39
17 loading. To -- as to Afshary's network, by adding 01:19:43
18 bit loading would be predictable, and that there 01:19:52
19 would be an improvement. I believe that's what I'm 01:19:55
20 referring to there in 145, and 146. 01:19:58

21 MR. HALVERSON: All right. Why 01:20:25
22 don't we take about a five-minute break. 01:20:26

1 THE WITNESS: Okay. Thank you. 01:20:29

2 (RECESS, 1:20 p.m. - 1:27 p.m.) 01:20:30

3 BY MR. HALVERSON: 01:27:53

4 Q. Mr. Bertonis, thank you very much. I 01:27:54

5 have no further questions, pending anything else 01:27:55

6 from your counsel. 01:27:57

7 MR. QUALEY: We have no questions. 01:27:58

8 MR. HALVERSON: Wonderful. 01:28:00

9 (CONCLUDED, 1:28 p.m.) 01:28:16

10 (Signature NOT WAIVED.) 01:28:16

11 01:28:16

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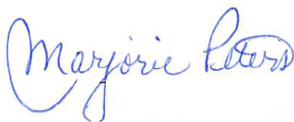
22

1 CERTIFICATE OF COURT REPORTER

2 I, Marjorie Peters, Fellow of the Academy of
3 Reporting, Registered Merit Reporter, Certified
4 Realtime Reporter, Realtime Systems Administrator,
5 and Notary Public in the District of Columbia,
6 before whom the foregoing deposition was taken, do
7 hereby certify that the witness was placed under
8 oath according to the law; that the foregoing
9 transcript is a true and correct record of the
10 testimony given; that said testimony was taken by me
11 stenographically and thereafter reduced to
12 typewriting under my direction, and that I am
13 neither counsel for, related to, nor employed by any
14 of the parties to this case and have no interest,
15 financial or otherwise, in its outcome.

16 I further certify that signature was
17 not waived by the witness.

18 IN WITNESS WHEREOF, I have hereunto set my
19 hand this 7th day of November, 2024.

20 
21

Marjorie Peters, FAPR, RMR, CRR, RSA

22 My commission expires October 31, 2024.

Veritext Legal Solutions
1100 Superior Ave
Suite 1820
Cleveland, Ohio 44114
Phone: 216-523-1313

November 7, 2024

To: Paul T. Qualey

Case Name: Comcast Cable Communications, LLC v. Entropic
Communications, LLC

Veritext Reference Number: 6945808

Witness: James Bertonis , TS Deposition Date: 10/30/2024

Dear Sir/Madam:

Enclosed please find a deposition transcript. Please have the witness
review the transcript and note any changes or corrections on the
included errata sheet, indicating the page, line number, change, and
the reason for the change. Have the witness' signature notarized and
forward the completed page(s) back to us at the Production address
shown
above, or email to production-midwest@veritext.com.
If the errata is not returned within thirty days of your receipt of
this letter, the reading and signing will be deemed waived.

Sincerely,

Production Department

NO NOTARY REQUIRED IN CA

DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 6945808

CASE NAME: Comcast Cable Communications, LLC v. Entropic Communications, LLC

DATE OF DEPOSITION: 10/30/2024

WITNESS' NAME: James Bertonis , TS

In accordance with the Rules of Civil Procedure, I have read the entire transcript of my testimony or it has been read to me.

I have made no changes to the testimony as transcribed by the court reporter.

Date James Bertonis , TS
Sworn to and subscribed before me, a
Notary Public in and for the State and County,
the referenced witness did personally appear
and acknowledge that:

They have read the transcript;
They signed the foregoing Sworn
Statement; and
Their execution of this Statement is of
their free act and deed.

I have affixed my name and official seal
this _____ day of _____, 20____.

Notary Public

Commission Expiration Date

DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 6945808

CASE NAME: Comcast Cable Communications, LLC v. Entropic
Communications, LLC

DATE OF DEPOSITION: 10/30/2024

WITNESS' NAME: James Bertonis , TS

In accordance with the Rules of Civil
Procedure, I have read the entire transcript of
my testimony or it has been read to me.

I have listed my changes on the attached
Errata Sheet, listing page and line numbers as
well as the reason(s) for the change(s).

I request that these changes be entered
as part of the record of my testimony.

I have executed the Errata Sheet, as well
as this Certificate, and request and authorize
that both be appended to the transcript of my
testimony and be incorporated therein.

Date

James Bertonis , TS

Sworn to and subscribed before me, a
Notary Public in and for the State and County,
the referenced witness did personally appear
and acknowledge that:

They have read the transcript;
They have listed all of their corrections
in the appended Errata Sheet;
They signed the foregoing Sworn
Statement; and
Their execution of this Statement is of
their free act and deed.

I have affixed my name and official seal
this _____ day of _____, 20____.

Notary Public

Commission Expiration Date

ERRATA SHEET

Deposition of James Bertonis

Date: 10/30/2024

Case: Comcast Cable Communications, LLC -v- Entropic Communications LLC, Case IPR2024-00431, (PTAB)

Veritext Job. No.: 6945808

PAGE/LINE(S) CHANGE

REASON

60/9	mechanism ~~for~~ that would be necessary	Extra word
94/18-20	"Well, theoretically they can be, but in practice, there are significant problems with coax, as ~~they~~ <u>there</u> are with all mediums."	Transcribing error/typo
97/12-14	"Well, I mean, ethernet is -- you know, there's 10 megabit ethernet, ~~these~~ <u>there's</u> 100 megabit ethernet."	Transcribing error/typo
98/4	"That's <u>the</u> first thing."	Missing word
98/10-12	"You know, that would be considered a lot higher ~~than~~ <u>then</u> , today we would consider that not so high."	Transcribing error/typo
102/17-21	"Well, right off the bat, it lowers the signal-to-noise ratio, so whatever your signal was, in communications, we keep parameters, we always look at a signal-to-noise ratio, so right off, those are creating noise."	Transcribing error/typo
114/8	" ~~Jacobson~~ <u>Jacobsen</u> "	Correcting author's name/typo
116/7	are known to <u>have</u> poor isolation	Missing word
116/8	effect that reflected signals <u>have</u> on the frequency	Missing word

11-27-2024

Date

James G. Bertonis
James G. Bertonis

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

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

(A) to review the transcript or recording; and

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

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

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

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

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

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