

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

SAMSUNG ELECTRONICS CO.,	)	
LTD.; SAMSUNG ELECTRONICS	)	
AMERICA, INC.,	)	
	)	
Petitioner,	)	Case No. IPR2024-00896
	)	
vs.	)	
	)	
EMPIRE TECHNOLOGY	)	
DEVELOPMENT, LLC,	)	
	)	
Patent Owner.	)	
_____	)	

DEPOSITION OF
ROBERT AKL, PH.D.
WEDNESDAY, MAY 28, 2025, 8:05 A.M. PT/10:05 A.M. ET
VIA ZOOM VIDEOCONFERENCE

STENOGRAPHICALLY REPORTED BY:
CHERYL HAAB SCOTT, RDR, CRR, CCRR
CA CSR No. 13600
WA CCR No. 3499
NV CCR No. 1003

JOB NO.: 112925

1 UNITED STATES PATENT AND TRADEMARK OFFICE
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3 SAMSUNG ELECTRONICS CO.,)
4 LTD.; SAMSUNG ELECTRONICS)
5 AMERICA, INC.,)

6 Petitioner,)

Case No. IPR2024-00896

7 vs.)

8 EMPIRE TECHNOLOGY)
9 DEVELOPMENT, LLC,)

10 Patent Owner.)
11 _____)

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15 DEPOSITION OF ROBERT AKL, PH.D., taken via Zoom
16 Videoconference, on Wednesday, MAY 28, 2025, at
17 8:05 a.m. PT/10:05 a.m. ET, before Cheryl Haab Scott,
18 RDR, CRR, CCRR, Certified Shorthand Reporter No. 13600
19 in and for the State of California, Certified Court
20 Reporter No. 3499 in and for the State of Washington,
21 and Certified Court Reporter No. 1003 in and for the
22 State of Nevada.

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A P P E A R A N C E S
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For Petitioner Samsung Electronics Co., Ltd., and
Samsung Electronics America, Inc.:

O'MELVENY & MYERS LLP
BY: BRIAN COOK, ESQ.
400 South Hope Street, Suite 1900
Los Angeles, California 90071
213.430.6496
bcook@omm.com

O'MELVENY & MYERS LLP
BY: CAITLIN P. HOGAN, ESQ.
1301 Avenue of the Americas, Suite 1700
New York, New York 10019
212.326.4481
chogan@omm.com

For Patent Owner Empire Technology Development LLC:

MILBANK LLP
BY: NATHANIEL T. BROWAND, ESQ.
55 Hudson Yards
New York, New York 10001
212.530.5096
nbrowand@milbank.com

Also Present:

ALEJANDRO SOLORZANO, ZOOM TECHNICIAN
SHIREEN FAISAL

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I N D E X
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WITNESS: Robert Akl, Ph.D.

PAGE

Examination By Mr. Cook

6

1	INDEX TO EXHIBITS	
2	--000--	
3	EXHIBIT NO.	PAGE
4	Exhibit 1	"Petitioner's Notice of Deposition" 10
5	Exhibit 2	"Declaration of Robert Akl, D.SC. Regarding U.S. Patent No. 8,798,120" 15
6		
7	Exhibit 3	United States Patent No. 8,798,120 B2 (Petitioner Samsung Ex-1001, 0001 through 0016) 19
8		
9	Exhibit 4	"Decision Granting Institution of Inter Partes Review," IPR2024-00896 59
10		
11	Exhibit 5	"Preliminary Constructions" 81
12	Exhibit 6	"Claim Construction Order" 87
13	Exhibit 7	"Markman Hearing before Judge Roy S. Payne, United States Magistrate Judge" dated January 22, 2024 90
14		
15	Exhibit 8	United States Patent Application Publication, Pub. No.: US 2006/0067263 A1 (Petitioner Samsung Ex-1005, 0001 through 0015) 93
16		
17		
18	Exhibit 9	"Adaptive Multi-antenna Power Control in Wireless Networks" (Petitioner Samsung Ex-1006, 0001 through 0006) 102
19		
20	Exhibit 10	"Modulation Optimization under Energy Constraints" (Petitioner Samsung Ex-1007, 0001 through 0007) 113
21		
22		
23	Exhibit 11	"Performance of a UMTS Uplink MIMO Scheme" (Petitioner Samsung Ex-1008, 0001 through 0005) 131
24		
25		

1 WEDNESDAY, MAY 28, 2025
2 8:05 A.M. PT/10:05 A.M. ET
3 VIA ZOOM VIDEOCONFERENCE

4 --000--

5 THE COURT REPORTER: Good morning. My name is
6 Cheryl Scott. I am a California Certified Shorthand
7 Reporter and the deposition officer for today's
8 proceeding. My CSR license number is 13600.

9 May I have a stipulation from all counsel that
10 I may swear this witness in, currently seated in Dallas,
11 Texas.

12 MR. COOK: Yes, that's fine.

13 MR. BROWAND: That's agreed.

14 --o0o--

15 Whereupon,
16 ROBERT AKL, PH.D.,
17 having been called as a witness,
18 was duly sworn by the court reporter
19 and testified as follows:

20 --o0o--

21 EXAMINATION

22 BY MR. COOK:

23 Q Good morning, Dr. Akl. Could you please state
24 your full name.

25 A Robert Akl.

1 Q And could you please provide your home address.

2 A **3030 McKinney Avenue, Dallas, Texas 75204.**

3 Q And where are you located today for this
4 deposition?

5 A **I am located at that address.**

6 Q And you understand that you're under oath
7 today?

8 A **Yes.**

9 Q Do you have any applications open on your
10 computer other than the one you're using to access this
11 deposition?

12 A **Yes.**

13 Q What else do you have open?

14 A **I have a PDF viewer open, and I have my
15 declaration open.**

16 Q Electronic copy of your declaration from this
17 IPR proceeding?

18 A **Yes.**

19 Q Do you have other electronic documents open?

20 A **Not at this time, no, but I do have a physical
21 copy in front of me of the table of contents of my
22 declaration.**

23 Q Do you have any sort of e-mail applications or
24 any communication applications open?

25 A **I do not.**

1 Q And do you have a phone or any other
2 communication device there that's accessible to you?

3 A Not within reach right now.

4 Q Okay. Will you just make sure you're not using
5 that phone or any other communication device to speak
6 with anybody during the deposition today or text?

7 A Yes, of course.

8 Q And you understand that you're not to speak
9 with anyone about the substance of your deposition
10 during breaks today?

11 A Yes.

12 Q Have you been deposed before?

13 A Yes.

14 Q About how many times?

15 A 175 times.

16 Q Have you been deposed over Zoom remotely like
17 we're doing today?

18 A Yes.

19 Q You mentioned you had some -- a printed table
20 of contents. Do you have any other physical documents
21 with you today?

22 A No. The only thing I have are the cover and
23 two page -- so it's the first three pages of my
24 declaration are printed in front of me. That's the only
25 document I have in front of me.

1 Q And do you have any notes or anything on that,
2 or is that a clean copy?

3 A It is a clean copy. It's an unannotated table
4 of contents.

5 Q So you're obviously very familiar with the
6 deposition process, but just a few ground rules here.

7 So we have a reporter today taking down
8 everything that we're saying. So it's important not to
9 talk over each other. So I will try to let you finish
10 your answers before I start talking; and can you do the
11 same for me?

12 A Yes.

13 Q And also because this is being transcribed, you
14 need to give audible yes/no answers because gestures or
15 uh-huh, uh-uh can't really be transcribed very
16 effectively.

17 So are you able to do that today?

18 A Yes.

19 Q Is there any reason that you cannot provide
20 your best testimony here today?

21 A No.

22 Q Were you able to download the exhibits that
23 were placed in the exhibit share?

24 A Yes.

25 Q If you could look in there, there should be one

1 marked as Exhibit 1. If you can open that up.

2 (Exhibit 1 was marked.)

3 **THE WITNESS: I have it now open.**

4 BY MR. COOK:

5 Q And do you recognize Exhibit 1?

6 A I had not seen it previously, but I understand
7 what it is.

8 Q What do you understand Exhibit 1 is?

9 A Petitioner's notice of my deposition which is
10 taking place right now.

11 Q And you understand you're being deposed today
12 in relation to IPR 2024-00896?

13 A Yes.

14 Q And this IPR deposition related to U.S. patent
15 number 8,798,120?

16 A Yes.

17 Q So if I refer to the '120 patent or challenged
18 patent today, will you understand that I'm referring to
19 U.S. patent 8,789,120 [sic]?

20 A Yes.

21 Q Sorry. I think I said the number wrong. But I
22 meant to say 8,798,120.

23 A Yes.

24 Q Now, on that notice of deposition, Exhibit 1,
25 the Petitioner is listed as Samsung Electronics Co.,

1 Ltd., and Samsung Electronics America, Inc.

2 Do you see that?

3 A Yes.

4 Q And if I refer today to "the Petitioner" or to
5 "Samsung," will you understand that I'm referring to
6 Samsung Electronics Co, Ltd., and Samsung Electronics
7 America, Inc.?

8 A Yes.

9 Q And that the Patent Owner on this -- on
10 Exhibit 1 is referred to as Empire Technology
11 Development, LLC.

12 Do you see that?

13 A Yes.

14 Q And if I refer to "Patent Owner" today or to
15 "Empire," will you understand that I'm referring to
16 Empire Technology Development, LLC?

17 A Yes.

18 Q What did you do to prepare for your deposition
19 today?

20 MR. BROWAND: Just caution the witness not to
21 reveal any privileged information.

22 THE WITNESS: I reviewed my declaration and I
23 reviewed relevant exhibits, and I had a call with
24 counsel yesterday.

25 ///

1 BY MR. COOK:

2 Q When you said "call with counsel," who did you
3 talk with?

4 A Counsel present here today.

5 Q That's Mr. Browand?

6 A Yes.

7 Q Anyone else you talked with?

8 A No.

9 Q And other than counsel, anybody else that you
10 met with or discussed anything with to prepare for your
11 deposition today?

12 A No.

13 Q You mentioned you reviewed some exhibits.
14 Do you recall what those were?

15 A Yes.

16 Q Which exhibits did you review?

17 A I reviewed exhibits that are cited in the
18 declaration that I wrote, specifically the prior art
19 that was cited in the petition.

20 Q Did you review any other exhibits besides the
21 prior art?

22 A No -- oh, yes. I reviewed the patent. I also
23 reviewed -- it's not an exhibit, but I also reviewed the
24 institution decision.

25 Q Other than institution decision, did you review

1 any documents dealing with claim construction?

2 MR. BROWAND: And just caution the witness not
3 to reveal any privileged communications.

4 THE WITNESS: I did not review documents
5 related to claim construction.

6 BY MR. COOK:

7 Q You said you had a meeting with counsel
8 yesterday. How long was that meeting?

9 A One hour and 45 minutes.

10 Q And is that the only meeting you had with
11 counsel to prepare for this deposition?

12 A Yes.

13 Q Did you spend time reviewing on your own?

14 A Yes.

15 Q About how much time did you spend reviewing on
16 your own?

17 A I spent a couple hours this past weekend and a
18 couple hours yesterday afternoon.

19 Q So about four hours total?

20 A I think more like six. Around three each day.

21 Q When did you first become involved in this IPR
22 on behalf of Empire?

23 A I don't recall.

24 Q Who contacted you about becoming involved in
25 this IPR?

1 **A Counsel for Patent Owner.**

2 Q Did you provide input on the preliminary Patent
3 Owner response that was filed in this IPR?

4 MR. BROWAND: Again, I caution you not to
5 reveal the content of any privileged communication.

6 **THE WITNESS: I don't recall.**

7 BY MR. COOK:

8 Q Did you provide any input on the preliminary
9 Patent Owner sur-reply?

10 **A I don't recall.**

11 Q You understand that there is related litigation
12 going on in district court in the Eastern District of
13 Texas in which the '120 patent is asserted against
14 Samsung; correct?

15 **A Yes.**

16 Q And are you involved in that litigation?

17 **A Yes.**

18 Q And did you submit an expert report in that
19 litigation regarding validity of the '120 patent?

20 **A Yes.**

21 Q Were you involved in claim construction for the
22 '120 patent in the district court litigation?

23 MR. BROWAND: Objection to form.

24 **THE WITNESS: I think so.**

25 ///
///

1 BY MR. COOK:

2 Q What was your involvement in claim construction
3 in the district court?

4 A I submitted a declaration -- I think I
5 submitted a declaration regarding claim construction. I
6 may have submitted a declaration regarding claim
7 construction. It's been a while.

8 Q Did you attend the claim construction hearing
9 in the district court litigation?

10 A No.

11 Q And have you reviewed orders or other documents
12 issued by the district court regarding claim
13 construction?

14 A Yes. I have reviewed the claim construction,
15 the preliminary and the final, our claim construction
16 order.

17 Q Did you review the transcript for the Markman
18 hearing?

19 A No.

20 MR. COOK: Could you open up the document
21 that's marked Exhibit 2.

22 (Exhibit 2 was marked.)

23 THE WITNESS: I have it open.

24 BY MR. COOK:

25 Q And do you recognize Exhibit 2?

1 A **Yes.**

2 Q What is Exhibit 2?

3 A **Exhibit 2 is my -- the declaration that I wrote**
4 **supporting Patent Owner's reply.**

5 Q For this IPR proceeding?

6 A **Yes.**

7 Q Could you turn to page 70 of Exhibit 2.

8 A **I am there.**

9 Q And is that your signature on page 70?

10 A **Yes.**

11 Q Who wrote this declaration?

12 A **I did.**

13 Q Did you write every word yourself?

14 A **I did not type every word myself, no.**

15 Q Who helped you?

16 A **It was done in collaboration with counsel.**

17 Q Did you provide edits to the attorneys?

18 A **Yes. It was a collaborative process.**

19 Q Were all of your edits incorporated?

20 A **Yes. The document -- the declaration reflects**
21 **my opinions and my analysis.**

22 Q You're being paid \$995 per hour for your work
23 on this IPR; is that correct?

24 A **I am compensated for my time, yes.**

25 Q At the rate of \$995 per hour?

1 A **That is correct.**

2 Q How many hours have you spent on this IPR
3 matter?

4 A **Around 20 hours.**

5 Q 20 hours total is what you spent on this IPR?

6 A **Yes. That's a good estimate.**

7 Q And that includes the eight hours or so that
8 you spent preparing for this deposition?

9 A **No. I meant that's in preparing my
10 declaration.**

11 Q So 20 hours preparing the declaration?

12 A **Yes. Around 20 hours. There is some overlap
13 in time because I also did work in the district court
14 case so that's an estimate, dividing the time because
15 there would have been overlap; but that's a good
16 estimate in terms of the amount of time to write and
17 finalize the declaration.**

18 Q So other than writing the declaration and
19 preparing for this deposition, have you done anything
20 else related to this IPR, any additional work?

21 A **No.**

22 Q Is there anything in your declaration that is
23 incorrect?

24 A **Not to my knowledge.**

25 Q Are there any opinions in your declaration that

1 you no longer agree with?

2 **A No, I still stand behind and agree with all the**
3 **opinions that I have and the analysis in my declaration.**

4 **Q Are all of your opinions regarding the validity**
5 **of the '120 patent as of the date you signed it included**
6 **in your declaration?**

7 MR. BROWAND: Objection to form.

8 **THE WITNESS: Your question is vague. I can't**
9 **answer it.**

10 BY MR. COOK:

11 **Q Let me try again.**

12 As of the date you signed your declaration,
13 were there any opinions you had on the validity of the
14 '120 patent that you did not include?

15 MR. BROWAND: Same objection.

16 **THE WITNESS: Your question is still vague.**

17 BY MR. COOK:

18 **Q What is it that you don't understand about the**
19 **question?**

20 **A You're asking me about the validity of the**
21 **patent, and that's too broad because I also have**
22 **opinions in district court. The opinions that I have in**
23 **response to the petition are in this declaration, and so**
24 **it is a narrower set of analysis that includes validity,**
25 **but it does not encompass all of my opinions regarding**

1 the validity of the '120 patent because I also have
2 opinions on the validity of the '120 patent in the
3 district court, and that's why your question was vague.

4 Q I understand. Are there any opinions you have
5 on the validity of the '120 patent over the particular
6 prior art references raised in the petition that you did
7 not include in your declaration?

8 A Those are the opinions that I have as of today
9 in support of Patent Owner's response.

10 (Discussion off the record.)

11 BY MR. COOK:

12 Q Could you open up tab -- or Exhibit 3, please.
13 (Exhibit 3 was marked.)

14 THE WITNESS: I have it open.

15 BY MR. COOK:

16 Q Do you recognize Exhibit 3?

17 A Yes.

18 Q And what is Exhibit 3?

19 A Exhibit 3 is U.S. Patent 8,798,120.

20 Q And that's the patent we're referring to as the
21 '120 patent?

22 A Yes.

23 Q So start with some background.

24 The '120 patent is about communications between
25 a base station and multiple mobile stations. Is that

1 fair?

2 MR. BROWAND: Objection to form.

3 THE WITNESS: At a high level, it does discuss
4 communication between two devices.

5 BY MR. COOK:

6 Q Can you turn to figure 4 of the '120 patent.

7 A I am there.

8 Q So figure 4 shows a base station, 405; correct?

9 A Yes.

10 Q And it illustrates a channel that labels 422?

11 A 422 is a communication channel as described in
12 the specification.

13 Q And figure 4 also shows three mobile stations
14 labeled 410, 415, and 420; is that right?

15 A Yes.

16 Q So let's look at mobile station 410, the one in
17 the upper left corner.

18 Do you see that?

19 A Yes.

20 Q That mobile station is depicted with two
21 antennas, 450 and 452; is that correct?

22 A Yes.

23 Q So when the mobile station is in a MIMO mode,
24 both antennas 450 and 452 are transmitting; is that
25 correct?

1 A Yes.

2 Q And when the mobile station 410 is set to a
3 SIMO mode, only one of the antennas, 450 and 452 is
4 transmitting?

5 A Yes.

6 Q And this mobile station 410 both transmits and
7 receives; is that correct?

8 A Yes.

9 Q And so mobile station 410 includes two
10 transceivers, one connected to each antenna?

11 MR. BROWAND: Objection to form.

12 **THE WITNESS: It does have at least one**
13 **transceiver.**

14 BY MR. COOK:

15 Q Is one transceiver connected to two antennas,
16 or is there one transceiver connected to each antenna?

17 MR. BROWAND: Objection. It's compound.

18 **THE WITNESS: I haven't rendered an opinion**
19 **on -- I don't believe I have a specific opinion on -- in**
20 **answer to your question.**

21 BY MR. COOK:

22 Q In a MIMO broadcast, does that involve two
23 separate transmitters?

24 A It could.

25 Q Are there times when a MIMO broadcast would

1 involve only one transmitter?

2 A Depends on the context. So if you're
3 replicating the data and sending the same data on two
4 antennas, that may be a possibility.

5 Q Maybe you can explain that a little bit. How
6 would you send two -- over two antennas with one
7 transmitter?

8 A If the data that is being generated is the
9 same, you may have a single circuitry that's encoding
10 the data that is connected to two antennas. I don't
11 think that's an issue with regarding to these
12 proceedings, but your question was broad enough and I
13 was trying to answer your question in a vacuum. Not
14 related to this patent.

15 Q In this patent, are there two transceivers in
16 the mobile station, one connected to each antenna?

17 MR. BROWAND: Objection to form.

18 THE WITNESS: There are two -- the patent
19 describes two circuitries. A first circuitry and a
20 second circuitry. The first and second circuitry, which
21 are labeled 454 and 460, are examples of transceivers in
22 the embodiments disclosed in figure 4.

23 BY MR. COOK:

24 Q Okay. So in the example of figure 4, 454 is
25 one -- the portion of one transceiver, and 460 is the

1 portion of another transceiver; is that correct?

2 MR. BROWAND: Objection to form.

3 THE WITNESS: Well, a transceiver is a
4 transmitter receiver; and at least what's shown in 454
5 looks more of a transmitter. So you do have at least a
6 transmitter 454 and a transmitter 460.

7 BY MR. COOK:

8 Q And so the receive chain of the mobile station
9 transceiver is not shown on figure 4, then; is that
10 correct?

11 A Well, you do have some disclosure. If you look
12 at the arrow after, are -- the arrow coming from antenna
13 450 and 452, you see you have what looks like an
14 arrowhead in both directions, one going through the
15 antenna, 450, and that's right outside 454, for example;
16 and one in the other direction. So there is some
17 disclosure of an antenna being able to receive because
18 information is flowing from the antenna and going to a
19 feedback decoder --

20 (Reporter clarification.)

21 THE WITNESS: 477. That's the number. The
22 number 477.

23 BY MR. COOK:

24 Q But the circuitry that makes up the receiver
25 chain is not shown in figure 4.

1 Is that fair?

2 **A I don't have opinions on that.**

3 Q Do you see anything in mobile station 410 that
4 appears to be circuitry that is related to the receive
5 chain?

6 MR. BROWAND: Objection to form.

7 **THE WITNESS: There is a feedback decoder and a**
8 **controller. So to the extent those are or are not, I**
9 **don't have opinions on that. But they could be.**

10 BY MR. COOK:

11 Q But you don't see, for example, a low-noise
12 amplifier shown in figure 4; correct?

13 A **There is a power amplifier 459 as part of the**
14 **transmitter.**

15 Q And that's a power amplifier associated with a
16 transmitter, you said?

17 A **At least that's how it's described in column 11**
18 **of the specification.**

19 Q And there's another power amplifier 465
20 associated with the other transmitter?

21 A **Yes, associated with the circuitry 460, which**
22 **may include a power amplifier 465.**

23 Q But there's no low-noise amplifier associated
24 with a receive chain that's shown in figure 4; is that
25 correct?

1 A I don't have opinions on that.

2 Q Looking at figure 4, you don't see a low-noise
3 amplifier illustrated, do you?

4 A I haven't rendered an opinion on that, but it
5 doesn't look like there is a low-noise amplifier
6 explicitly shown in the embodiment because the
7 embodiment is focusing on the transmitter and not the
8 receiver, per se.

9 Q So if figure 4, it's really only the
10 transmission chain that's shown, not the receive chain.
11 Is that fair?

12 MR. BROWAND: Objection to form.

13 THE WITNESS: No, I disagree with that
14 characterization.

15 BY MR. COOK:

16 Q What do you disagree with?

17 A You already -- we've already discussed earlier
18 whether there is part of the receiver chain and we
19 discussed there is a feedback decoder and a controller.
20 And so I disagree with that characterization based on
21 the response that I gave earlier.

22 Q But the transmission chain is shown in block
23 454.

24 Is that fair?

25 A 454 is a first circuitry or an example of a

1 first circuitry related to transmission. That is fair.

2 Q Okay. And the signal path for data comes from
3 encoder 470 and then goes through the components shown
4 inside the block 454 and then out to the antenna; is
5 that correct?

6 A In the embodiment of figure 4. That is fair.

7 Q So, for example circuit items 455, 456, 457,
8 458, and 459 is all circuitry that's in the -- one of
9 the transmission chains shown in -- in mobile station
10 410.

11 Is that fair?

12 MR. BROWAND: Objection to form.

13 THE WITNESS: They are part of the first
14 circuitry that are used for transmission as described in
15 the specification in column 11 and other parts of the
16 specification.

17 BY MR. COOK:

18 Q And is that also -- and so you have a
19 disagreement with calling that a transmission chain. Is
20 that -- do you agree that the circuitry in blocks -- in
21 Box 455 would be the transmission chain?

22 A I haven't rendered an opinion on that -- that
23 specific question. Sorry.

24 Q Do you have an understanding of what a
25 transmission chain is?

1 A The term appears once in the patent in
2 column 3, line 6. And I do have a general understanding
3 of what a transmission chain is. But again, the patent
4 does not describe figure 4 in terms of transmission
5 chains.

6 Q What is your general understanding of what a
7 transmission chain is?

8 A Those words would have plain and ordinary
9 meaning. I have not provided a description of what a
10 transmission chain is.

11 Q But what is your general understanding of what
12 a transmission chain is?

13 MR. BROWAND: Objection to form.

14 THE WITNESS: It would have its plain, ordinary
15 meaning. I have not articulated a definition for it.

16 BY MR. COOK:

17 Q What is the plain and ordinary meaning of
18 "transmission chain"?

19 MR. BROWAND: Same objection, Counsel.

20 THE WITNESS: I have not articulated a
21 definition. If I would be doing -- if I give you a
22 definition, I would be doing claim construction.

23 So I can give you an example. So at a high
24 level, a transmission chain might be, you know, a
25 sequence of processes that are involved in transmission.

1 But that would be, like, an example. I'm not
2 articulating an exact definition.

3 BY MR. COOK:

4 Q So a transmission chain are processes?

5 A No. You're mischaracterizing what I said. I'm
6 not giving you a definition of what a transmission chain
7 is. I'm giving you an example of what -- how a POSITA
8 might understand the plain and ordinary meaning of what
9 a transmission chain is.

10 Q Would a POSITA understand a transmission chain
11 to be a series of circuits in the transmission path?

12 MR. BROWAND: Objection to form.

13 THE WITNESS: It could be depending on how --
14 the context. So at least in the patent, it describes a
15 first circuitry and a second circuitry, where it's
16 lumping the first circuitry -- lumping multiple smaller
17 circuits as part of the first circuitry that's involved
18 in transmission; and those examples would be what we saw
19 in figure 4, like the 455 -- item 455, item 456, 457,
20 and it describes all of them together as part of 454,
21 which is the first circuitry. And so an example of a
22 first circuitry could be a transmission chain.

23 BY MR. COOK:

24 Q And the first circuitry there labeled 454 is in
25 the signal path to antenna 450; correct?

1 MR. BROWAND: Objection to form.

2 THE WITNESS: I don't understand the question.

3 BY MR. COOK:

4 Q There's a certain path that data follows to get
5 from, for example, in encoder 470 to antenna 450;
6 correct?

7 A Yes. In figure 4, it does show a path from
8 encoder 470 to antenna 450.

9 Q And that transmit path goes through the
10 circuitry in block 454; is that correct?

11 A It does in the example in figure 4 as an
12 embodiment.

13 Q And figure 4 involves station 410 also shows
14 another transmit signal path that goes through block
15 460; is that correct?

16 A Yes. As an example in this embodiment, it
17 does.

18 Q And I think as you mentioned, the circuitry in
19 block 454 is referred in the patent -- is referred to in
20 the '120 patent as the first circuitry; is that right?

21 A Yes.

22 Q And block 460 is called the "second circuitry"?

23 A Yes. This is consistent with the description
24 in column 11, describing figure 4.

25 Q And is there anything in the first circuitry

1 454 that you would say is not part of the transmission
2 chain?

3 MR. BROWAND: Objection to form.
4 Mischaracterizes testimony.

5 THE WITNESS: I have -- I -- your question
6 assumes that I have stated that 454 is equal to the
7 transmission chain, which I have not. I have not
8 provided a definition of a transmission chain. I've
9 stated that that term appears once in the patent, and I
10 stated that the first circuitry can be an example of a
11 transmission chain at least in an embodiment of
12 figure 4.

13 BY MR. COOK:

14 Q Could you turn to column 2 of the '120 patent
15 around line 12 of so.

16 A I'm there.

17 Q So the '120 patent is saying here that the
18 '120 patent is generally about selecting a transmit mode
19 in a communication system.

20 Is that true?

21 A I do see those words.

22 Q And is an example -- an example of that is
23 calculating data rates or a MIMO mode and a SIMO mode,
24 and then selecting a MIMO or SIMO mode based on the
25 energy consumption of the data rates in those modes?

1 A It states calculating a first transmission rate
2 or data and a multiple input, multiple output of the
3 communication system, and calculating a second
4 transmission rate for data in a Single Input Single
5 Output mode. And a mode may be selected from a group
6 consisting of MIMO mode and SIMO mode based, at least in
7 part, on an energy consumption of the first and second
8 transmission rates.

9 Q So the '120 patent is directed to selecting a
10 MIMO or SIMO mode based, at least in part, on which mode
11 provides the lower energy transmission, the
12 communication system?

13 MR. BROWAND: Objection.

14 THE WITNESS: That is not exactly what is
15 stated here. You've added an assumption regarding
16 higher and lower. What we've read just states that it's
17 based on energy consumption, but it has not provided a
18 relationship yet.

19 BY MR. COOK:

20 Q Let's just turn to your declaration for a
21 moment. That's Exhibit 2. And turn to paragraph 27.

22 A I am there.

23 Q I think the second or third sentence of that
24 paragraph says:

25 "Thus, the '120 patent is directed to selecting

1 a MIMO mode or SIMO mode based, at least in part, on
2 which mode provides a lower energy per bit transmission
3 in a communication system."

4 Do you agree with that statement?

5 A Yes. That's from a different part of the
6 specification that we were looking at. We were looking
7 at column 2, and this example is from column 4.

8 Q So if we turn back to the patent, the
9 '120 patent. I want to ask a little about the equation
10 that's shown in column 3 at around line 15.

11 A I am there.

12 Q So this equation is referring to an energy
13 optimized rate and it is -- appears to be finding the
14 value of the rate R that minimizes the energy
15 consumption. Is that what that is -- the equation is
16 doing?

17 A It's an energy optimized rate, which is a rate
18 for user I; having a designated rate, R; and it's
19 looking at the first term in the equation is argmin. So
20 it's looking -- at least in that example, at minimizing
21 over certain parameters that are inside the equation,
22 the rate, or the energy for a specific rate.

23 Q And in that equation, there's a variable in
24 there. Is that the Greek letter Nu. See that one? I
25 don't know if it's a v or an Nu.

1 A I don't recall my Greek letters, but yes.

2 Q It looks like a v . So we'll call it a v , if
3 that's all right.

4 A That's fine. It looks like an italicized v .
5 We can go with that, and it helps the court reporter.

6 Q Okay. So the -- in that variable v , it says
7 it's the fraction of the time that the user is
8 transmitting. And then $1 - v$ is the fraction of the
9 time the user is idle; is that correct?

10 A Yes, there is an index for that v per user. So
11 that's fair on a per user, I , basis.

12 Q So that first variable, v , is multiplied by a
13 function called f , which is referred to as the power
14 consumed during transmission; is that correct?

15 A Line 25 of column 3 does state that f is a
16 function of an amount of power consumed by user I during
17 transmission.

18 Q And then $1 - v$ is multiplied by P_{idle} , which
19 is the idle power consumption; is that right?

20 MR. BROWAND: Objection to form.

21 THE WITNESS: Equation 3 does have a P_{idle}
22 variable that's multiplying $1 - v$ of I .

23 BY MR. COOK:

24 Q Is your understanding that P_{idle} was referring
25 to the idle power consumption?

1 A I don't think it's explicitly stated; but based
2 on the previous paragraph, it does state that there is
3 idle power that's consumed due to leakage current or
4 other effects. So it is common when idling to consume
5 some power, and I think a POSITA would understand that
6 variable to be referring back to what's described in
7 words in the column 3, lines 4 through 8.

8 Q So this equation around line 15 of column 3,
9 it's basically taking a power consumption while
10 transmitting and multiplying it by the fraction of time
11 the user is transmitting; and then it's adding that to a
12 product of the idle power consumption and the fraction
13 of the time the system is idle.

14 Is that a fair characterization?

15 A In part. Those are terms in the equation, but
16 they're not the entire equation.

17 Q Okay. And then if we go down a little further,
18 there's kind of a block between lines 35 and 40,
19 column 3. There's another equation there that's for the
20 function f of r , which is the transmission power
21 equation for the MIMO case; is that right?

22 A Yes.

23 Q And then that equation for f of r has a first
24 term and then a second term where the second term is
25 p_{dc}, s .

1 Do you see that?

2 A Yes.

3 Q And is $p_{dc,s}$ the power consumption of the
4 circuitry coupled to the antennas for the MIMO case?

5 A Yes, based on columns 46, 47, and 48 of
6 column 4. Sorry, of column 3.

7 Q And then that first term, does that represent
8 the transmitted power?

9 A Well, the first term plus $p_{dc,s}$ is the
10 transmission power.

11 Q Okay. So the $p_{dc,s}$ is the circuit power; is
12 that right?

13 A Is the power consumption of circuit coupled to
14 the multiple antennas that are configured to transmit in
15 the MIMO mode.

16 Q Okay. And what is the first term of that
17 equation between lines 35 and 40 of column 3?

18 A They're described in lines 41 through 45.
19 Would you like me to read those words?

20 Q No, that's not necessary.

21 But is one of these terms the radiated power
22 and one of these terms the circuit power?

23 MR. BROWAND: Objection to form.

24 THE WITNESS: I don't see the words "radiated
25 power" here. I don't have an opinion on that.

1 BY MR. COOK:

2 Q You don't have an understanding of whether
3 that's the radiated power that's being added to the
4 circuit power?

5 MR. BROWAND: Same objection.

6 **THE WITNESS: Sorry. I don't have an opinion**
7 **on that. It's outside the scope of this declaration.**

8 BY MR. COOK:

9 Q Okay. On that first term, is divided by a -- I
10 think that's a Greek letter Eta. Looks like a
11 lowercase n, and that's described as the power amplifier
12 efficiency.

13 Do you see that?

14 A **I do.**

15 Q And the overall expression, f of r, do you
16 agree, is described as the transmission power equation?

17 A **In this embodiment, yes.**

18 Q And that's divided by this Greek letter Eta
19 because which is the power amplifier efficiency because
20 as the efficiency gets larger, the amount of power that
21 you need to transmit is lower for a given data rate.

22 Is that fair?

23 A **I don't have an opinion on that. It's outside**
24 **the scope of my declaration. I haven't rendered an**
25 **opinion on this equation. It's not relevant to the**

1 opinions for the reply for the petition.

2 Q So you haven't analyzed this equation or tried
3 to figure out what these terms mean?

4 MR. BROWAND: Objection to form.

5 THE WITNESS: It's not relevant. I have not
6 rendered opinions on this equation. I've written a
7 declaration that is a reply to a petition; and as a
8 result, the questions that you're asking me are outside
9 the scope of my declaration.

10 BY MR. COOK:

11 Q In this equation, f of r, is used to calculate
12 the energy optimized rate; is that right?

13 A The function appears in the earlier equation
14 around line 15.

15 Q And that equation on line 15 we've talked about
16 is used to calculate the energy optimized rate?

17 A Line 11 states that it is an energy optimized
18 rate that may be expressed mathematically using the
19 following equation. So again, this is an example or an
20 embodiment describing a mathematical equation because it
21 uses the verb "may."

22 And we've been going about an hour. Is this a
23 good time for a break?

24 MR. COOK: If you give me just a couple more
25 minutes, I think I can finish up this section and we can

1 take a break if that works.

2 THE WITNESS: Sure.

3 BY MR. COOK:

4 Q If you look at that equation between lines 35
5 and 40, there's a multiplicative term there, N_0 , which is
6 noise power.

7 Do you see that?

8 A Yes.

9 Q And so the transmitted power relates to the
10 noise power because the signal-to-noise ratio governs
11 what sort of bit rate you can support in a given
12 channel.

13 Is that fair?

14 MR. BROWAND: Objection to form.

15 THE WITNESS: I don't have opinions on that.
16 It's outside the scope of my declaration and not
17 relevant for the opinions that I have.

18 And again, this equation that you're referring
19 to is an example as stated in line 33, it says in one
20 example, "the transmission power may be expressed" so
21 again, these are just examples. And your questions seem
22 to imply that that's at least -- if I'm understanding
23 your question, that's what it is versus this is an
24 example of an embodiment.

25 ///

1 BY MR. COOK:

2 Q In general terms, does the bit rate that a
3 channel can support depend on the noise in the channel?

4 A It could.

5 Q Under what conditions would it depend on the
6 noise in the channel?

7 A I haven't rendered an opinion on that in this
8 declaration. It's outside the scope of my opinions here
9 today.

10 Q So you don't have any opinion on how noise
11 could affect the bit rate supportable by a channel?

12 A My declaration speaks for itself. If you want
13 to direct me somewhere specifically in my declaration, I
14 can answer your question. Otherwise, it's too broad and
15 vague.

16 MR. BROWAND: Counsel, are you finished with
17 this line?

18 MR. COOK: Just about. Maybe just one or two
19 more questions. About five minutes if that's all right.

20 I'd --

21 THE WITNESS: Actually, since there isn't a
22 question pending, let's take a break, and you can ask
23 your questions when we get back.

24 MR. COOK: All right. Let's take a break.

25 THE WITNESS: Ten minutes should be fine.

1 (Recess.)

2 BY MR. COOK:

3 Q Doctor, let's go to your declaration. I'd like
4 you to turn to paragraph 50.

5 A I'm there.

6 Q So in paragraph 50 of your declaration, you
7 quote several statements from the patent saying that
8 transceivers that are waiting to send data or waiting to
9 send transmissions are idle; is that correct?

10 A Yes, in part. I'm saying that in the context
11 of the '120 patent, "idle" in this case is when you're
12 waiting to send data.

13 Q And what does it mean for a transceiver to be
14 waiting to send data?

15 MR. BROWAND: Objection to form.

16 THE WITNESS: It means it is on, but it's not
17 sending yet, and it is waiting for the bits or for the
18 signal to be generated to send.

19 BY MR. COOK:

20 Q Waiting for which signal to be generated?

21 A That is going to be transmitted.

22 Q So if we turn back a page or so to paragraph 48
23 of your declaration, you make an analogy to a car and
24 say that an idle car is one that's powered on but not
25 actively working.

1 Do you see that?

2 A Yes.

3 Q What do you mean by "not actively working"?

4 A Not moving. So when you're in your car and
5 you're at a stoplight, for example, your car is idling,
6 it is on, but it is not moving. You're waiting to go
7 once the light turns green. That's the analogy or the
8 example that I'm giving in paragraph 48.

9 Q Okay. So if I'm driving my car, I come to a
10 red light, put my foot on the brake and stop the car,
11 it's idled because I'm waiting for the light to turn
12 green, waiting to go.

13 Is that what you're saying?

14 MR. BROWAND: Objection to form.

15 THE WITNESS: I'm saying in my example, you're
16 driving your car; you've gotten to a red light;
17 you've -- you know, you have your brakes on; the car is
18 still on, but it's not moving.

19 That would be an example of a car idling.

20 BY MR. COOK:

21 Q And is the car still working in that situation?

22 A It's not actively working, as in it's not
23 moving but it is on. It does consume some gas when it's
24 idling, and that would be the example or the analogy
25 that I gave.

1 Q So in that case, the car is waiting to go
2 because when I lift my foot off the brake and step on
3 the gas, it's going to start moving again.

4 Is that consistent with your understanding of
5 what "idle" is?

6 A That is consistent with an example of what an
7 idling car is.

8 Q And that's different from a car that's just
9 parked and fully off because it's not waiting to go?

10 A A car that is parked and fully off is a car
11 that is not waiting to go. That would be another --
12 that -- that would extend this example. And that's
13 fair.

14 Q In the previous paragraph, paragraph 47 of your
15 declaration, you state that you disagree with the
16 board's preliminary construction.

17 Is that still your opinion?

18 A Yes. I disagree in part with part of the
19 construction that they provided.

20 Q Okay. What is the part of the construction
21 they provided that you disagree with?

22 A I don't believe I have it in front of me. I do
23 see that you gave me that exhibit. But my recollection
24 is, they say -- again, I'd rather see it just so that I
25 don't paraphrase incorrectly; but I think they say it

1 could be on or off. And I disagree with the "off." I
2 believe the plain and ordinary meaning of idle power
3 means it is on and waiting to send.

4 So there's two parts that must be satisfied:
5 That it is on; and you're waiting to send, which would
6 differentiate it from when it's on and sending. So on
7 and sending is not idling. On and waiting to send is
8 idling, and that would contribute to idle power
9 consumption.

10 And if you're off, you're off. You're not
11 going to be waiting to send if you're off. And I think
12 it's that part of the construction that I disagree with.
13 So I disagree with the first part but not the -- the
14 last part. And I believe you provided me the Exhibit 4.

15 So looking at Exhibit 4, if you want to direct
16 me to the court's claim construction, I can be more
17 precise if you want me to.

18 Q Okay. We'll come back to that in a minute. I
19 want to ask you about a couple other statements in
20 paragraph 47.

21 You say in paragraph 47 that idle power
22 consumption should be construed to mean power consumed
23 when the mobile station and first and second circuitry
24 are powered on and waiting to send.

25 Do you still agree with that opinion?

1 A Yes.

2 Q And then you say "Or in a manner consistent
3 with the preliminary claim construction of the district
4 court."

5 Do you still agree that it could also be
6 construed in a manner consistent with the preliminary
7 claim construction of the district court?

8 A Yes. And I understand we now have a final
9 construction; and my opinions are also consistent with
10 that final construction.

11 Q So are you saying that power consumption while
12 the mobile station and first and second circuitry are
13 powered on and waiting to send is consistent with the
14 district court's preliminary construction?

15 MR. BROWAND: Objection to form.

16 THE WITNESS: I believe Exhibit 5 that you
17 provided me is the court's preliminary construction.
18 And looking at Exhibit 5, it says number C, or:

19 "An idle power consumption of a mobile station,
20 the preliminary construction is power consumed by the
21 first and second circuitry when the mobile is powered
22 on, enabled for transmitting but waiting to send."

23 So the answer to your question is yes.

24 BY MR. COOK:

25 Q Now, if we can go to paragraph 45 of your

1 declaration.

2 You point out there that the board's
3 preliminary construction is power consumption during
4 which the transceiver may be waiting to send data
5 whether the transceiver is on or off.

6 Is that right?

7 A Yes. Thank you. So I do have it quoted here.
8 I just couldn't remember exactly where it was. Yes.
9 That's my understanding of what the board said; and I
10 disagree with the last part, whether the transceiver is
11 on and off. If it's off, it's not waiting to do
12 anything. And so that would be consistent --
13 inconsistent with the earlier part of the construction,
14 where it says "Waiting to send data."

15 So I agree that the first part, which says
16 "when the transceiver may be waiting to send data," that
17 is correct. And the transceiver has to be on to be able
18 to be waiting to send data, and so the "Or off" part is
19 the part of the construction that I disagree with and I
20 believe it's inconsistent with the -- with its own first
21 part and it's inconsistent with the Court's -- district
22 court's preliminary construction and final construction.

23 Q So is it your opinion that the transceiver must
24 be on to be consuming idle power?

25 A It is my opinion that the -- it must be on and

1 waiting to send, but not sending, to be consuming idle
2 power.

3 So there's two things that have to be met. It
4 has to be on and it has to be waiting to send.

5 Q So a transceiver cannot be off and waiting to
6 send?

7 A Yes. That doesn't make sense. If it's off,
8 it's off. It's not waiting to do anything.

9 Q And a transceiver cannot be off and consuming
10 idle power?

11 MR. BROWAND: Objection to form.

12 THE WITNESS: It cannot be off and consuming
13 idle power. That's fair. Usually if it's off, it's not
14 consuming any power. It could be in a sleep mode or a
15 deep sleep mode where there might be a little bit of a
16 leakage, but that's usually 0 or close to 0 or
17 considered 0. So that would be in the same bucket as
18 off which would be different than when it's idle.

19 BY MR. COOK:

20 Q Because in that situation, it's not waiting to
21 send?

22 A Because -- can you -- and your question is
23 vague, what do you mean by "in that situation"? If you
24 can please ask your question in full, I can better
25 answer it.

1 Q Sure. So it's your position that a transceiver
2 cannot be off and consuming idle power because in that
3 situation, it is not waiting to send?

4 MR. BROWAND: Objection to form.

5 THE WITNESS: So your question is a little
6 compound because you're asking me two things at once. I
7 think I answered it, and I can address each one.

8 If it's off, it's not waiting to send. It's
9 not waiting to do anything. It's off. So I think that
10 would be inconsistent with the specification of what it
11 means to be consuming idle power. You have to be on and
12 you have to be waiting to send to consume idle power.

13 BY MR. COOK:

14 Q Can any portion of the transceiver be off and
15 still consuming idle power?

16 MR. BROWAND: Objection to form.

17 THE WITNESS: I don't have specifically an
18 opinion on that. I think those hypotheticals are not --
19 I did not need to provide opinions on hypotheticals like
20 that. The specification is clear what it means to be
21 idle power consumption. And so I don't specifically
22 have an answer to your hypothetical because I guess I
23 would consider it an incomplete hypothetical.

24 BY MR. COOK:

25 Q Well, let me ask it like this, then. You said

1 the transceiver has to be on and waiting to send.

2 Does that mean all circuitry within the
3 transceiver has to be on?

4 MR. BROWAND: Objection to form.

5 THE WITNESS: Again, I'm not sure what you mean
6 by "all," and it's still an incomplete hypothetical. So
7 at least for the opinions I have here regarding rebuttal
8 opinions to the petition, the circuitry -- because when
9 we get to the claims -- really the claims describe first
10 circuitry and second circuitry, and they're not -- it's
11 all, one or nothing. In a sense like the -- we don't
12 need to worry about individual or part of components
13 that your hypothetical seems to imply.

14 So in the context of the claims and the scope
15 of the claims, it's either on or off; and my opinion in
16 the context of the claims, to have idle power, the first
17 circuitry or the second circuitry that are related to
18 the transmission, those have to be on and waiting to
19 send.

20 BY MR. COOK:

21 Q Okay. So a transceiver being on at least means
22 that the first circuitry and the second circuitry have
23 to be on.

24 Is that what you're saying?

25 A The transceiver related to the first circuitry

1 would be on if you're looking at that transmitter, and
2 the transceiver related to a second circuitry is on and
3 waiting to send. So going back to the claim language
4 of -- you have a first circuitry and you have a second
5 circuitry, those would be on and waiting to send for --
6 to have idle power in the context of the claim language.

7 Q So thinking about the -- like, the transceiver
8 associated with the first circuitry. Can the
9 transmission chain be off and the transceiver still be
10 consuming idle power?

11 MR. BROWAND: Objection to form.

12 THE WITNESS: No. If it's off, it's off. Now,
13 it could be, like, in a sleep mode. It's just, like,
14 off as far as the claim language is concerned. Because
15 to the extent there is a little bit of leakage, that's
16 usually considered 0. So it would just be like being
17 off.

18 Idle power as described in the patent or idle
19 power consumption as described in the patent does
20 include leakage; but just because you have a little bit
21 of leakage, doesn't make it idle. It does state you
22 could have some leakage which you tend to have in
23 circuitry, but it also describes you have other power.

24 So if we go back to paragraph 50, where the
25 specification -- this is the second bullet point of the

1 specification. It says:

2 "Idling transceivers turn off their
3 transmission chains. Some idle power may be consumed
4 due to leakage and other effects."

5 So the leakage current in this case -- you
6 know, it's usually not 0, and the other effects tend to
7 also contribute to the idle power consumption. That's
8 not going to be the case when it's off or sleeping where
9 it's either -- there's no power consumption; there is no
10 leakage; and even if there is a little bit of leakage,
11 that's usually set to 0. And so that amount of power is
12 normally 0 and that would not be idle power.

13 BY MR. COOK:

14 Q Okay. I guess I'm a little confused by your
15 answer.

16 In this paragraph you're pointing me to at
17 paragraph 50 of your declaration, there's the second one
18 there where it quotes the patent that column 3, lines 2
19 through 10. Here, where it says -- it talks about:

20 "A number of transceivers may become idle
21 waiting to send transmissions over the communication
22 channel." And then it says "Even if the idling
23 transceivers turn off their transmission chains, some
24 idle power may be consumed due to leakage current or
25 other effects."

1 Are you saying that that -- are those idling
2 transceivers that turn off their transmission chains
3 consuming idle power?

4 A I'm saying in the context of this bullet point,
5 you still have -- what makes it idle is you're still
6 waiting to send over the communication channel, and so
7 when it's saying here you're turning off their
8 transmission chains, it means they're not sending.
9 You're still consuming idle power, and that idle power
10 is attributed to two things. You know, it could be
11 attributed to leakage, which in this case would not be
12 0; and to other effects that would also not be 0.

13 That's what this is saying here, and that would
14 be different than the hypothetical that you gave me
15 where it's off and that would not be, you know -- if
16 it's off and you're not waiting to send, then that is
17 not consuming idle power.

18 Q Okay. But if it's off and you are waiting to
19 send, then it's consuming idle power?

20 MR. BROWAND: Objection to form.

21 THE WITNESS: Your question is vague. I mean,
22 so here, when it says you're turning off their
23 transmission chains, it means you're not sending, but
24 you're still waiting to send.

25 So the context of this sentence is you are

1 consuming idle power when you're -- when the circuitry
2 is on and you are waiting to send. And the power
3 consumption is going to be due to leakage current which,
4 in this case, would not be 0; and other effects, which
5 would not be 0. And so the statement, "Idling
6 transceivers turn off their transmission chains," a
7 POSITA would understand it, that you're not actively
8 sending. Like you're turning off your transmission
9 chains. It's not -- that is not the same as a circuitry
10 that is off and not waiting to send.

11 BY MR. COOK:

12 Q Okay. In this quote that we're looking at from
13 the '120 patent at column 3, lines 2 through 10, when it
14 says "even if the idling transceivers turn off their
15 transmission chains," what is it that the transceivers
16 are turning off in that case?

17 A The activity to send. They're not actively
18 sending.

19 Q And how does the transceiver turn off the
20 activity to send?

21 MR. BROWAND: Objection to form.

22 THE WITNESS: They're not sending. So they're
23 waiting to send. That's the context of this bullet
24 point. They don't have an active signal that is being
25 sent.

1 BY MR. COOK:

2 Q Okay. So is any of the circuitry being turned
3 off when the transceivers turn off their transmission
4 chains?

5 MR. BROWAND: Objection to form.

6 THE WITNESS: So going back to the claim
7 language where your first circuitry or second circuitry,
8 those are on, and you're still waiting to send.

9 BY MR. COOK:

10 Q So the first circuitry is on and you're waiting
11 to send even if the transceivers turn off their
12 transmission chains?

13 A In the context of this full bullet point, that
14 is correct. You are idle; you are waiting to send; you
15 are not sending right now, but you're waiting to send;
16 you are consuming idle power, which is due to, you know,
17 leakage which is not 0 in this context, and other
18 effects.

19 Q So in this situation, you're describing when
20 the idling transceivers turn off their transmission
21 chains. There's all the circuitry, for example, in
22 block 454 of figure 4 turned on?

23 MR. BROWAND: Objection to form.

24 THE WITNESS: In the context of the scope and
25 the claims, yes. You have a first circuitry that's on;

1 you are waiting to send.

2 BY MR. COOK:

3 Q Okay. Is it possible for the idling
4 transceivers to be waiting to send and not turn off
5 their transmission chains?

6 MR. BROWAND: Objection to form.

7 THE WITNESS: When you're waiting to send and
8 you're not sending, you are -- I mean, the context, how
9 a POSITA would understand and read this bullet point is
10 that you are on and you are waiting to send and so that
11 means that you've turned off your transmission chains
12 because you're not actively sending, but you're still
13 on. Like, the circuitry is still on. So the off is the
14 activity of sending, but the hardware, the circuitry is
15 still on because the circuitry is still consuming power
16 and that power is at least contributed to, you know,
17 power in the circuits as a result of being on, but it's
18 not actively sending.

19 BY MR. COOK:

20 Q So does turning off the transmission chain just
21 mean that you don't have data to send?

22 MR. BROWAND: Objection to form.

23 THE WITNESS: In the context of this bullet
24 point, you are idling; the circuitry is on; you are
25 waiting to send. And so you've turned off your

1 transmission chain because you're not actively sending
2 and you are waiting to send.

3 BY MR. COOK:

4 Q Okay. So just as one example: In the -- the
5 first circuitry includes a power amplifier; is that
6 correct?

7 A That is an example in figure 4, which is part
8 of the first circuitry.

9 Q And when a power amplifier is powered on, is it
10 consuming only leakage current?

11 A I haven't analyzed or provided opinions on a
12 component-by-component basis. Those are not relevant to
13 the opinions that I have because the claims just state
14 the first circuitry and they don't identify individual
15 components. So either the first circuitry is on or the
16 first circuitry is off, and we look at it as a whole.
17 So your question is outside the scope of my declaration.

18 Q Okay. So you don't have an opinion on whether
19 a power amplifier consumes more than leakage current
20 when it's on?

21 A I've already answered that question. I can
22 repeat my answer if you want me to, but I think I've
23 already answered your question.

24 Q Okay. I just want to -- you don't have an
25 opinion on that. Is that what you're saying? Because

1 it's outside the scope of your declaration?

2 MR. BROWAND: Object to the form.

3 THE WITNESS: Individual components are not
4 part of the claim language. So I -- we do not need to
5 go to that level to be able to provide -- or I don't
6 need to go to that level to provide opinions on the
7 challenge claims. Similarly, the district court didn't
8 go to that level as part of the claim construction.

9 So the claims described in first and second
10 circuitry and looking at the first and second circuitry,
11 the claim construction is part of -- or relate to the
12 first and second circuitry and doesn't need to go down
13 to the level of individual components in the circuitry.
14 So that's why your question is vague and it's outside
15 the scope of my declaration, and I would not be able to
16 answer your hypothetical.

17 BY MR. COOK:

18 Q So in the quote we're looking at from column 3,
19 lines 2 through 10, it first talks about a number of
20 transceivers that may become idle waiting to send
21 transmissions over the communication channel. And it
22 says "Even if the idling transceivers turn off their
23 transmission chains."

24 Does that mean there's two cases here. There's
25 a case where they do not turn off their transmission

1 chains and there's another case where they do turn off
2 their transmission chains?

3 MR. BROWAND: Objection to form.

4 THE WITNESS: A POSITA would understand this,
5 that it doesn't matter. It's not uncommon in
6 specifications to try to think of scenarios regardless
7 of how you interpret the even -- if I understand your
8 question correctly -- if it's meaning one or more
9 configurations. The -- a POSITA would understand this
10 bullet point to mean that the circuitry is on and you
11 are waiting to send regardless of how you view the
12 idling transceivers turning off their transmission
13 chains. So whatever you try to attribute to that
14 phrase, it doesn't change the opinion or the
15 understanding that the transceivers are idle because
16 they are on. They are consuming idle power and they are
17 waiting to transmit.

18 BY MR. COOK:

19 Q Okay. So does turning off transmission chains
20 mean that any hardware, any circuitry is being turned
21 off?

22 A That is not how a POSITA would understand this
23 bullet point.

24 Q So a POSITA would understand that transceivers
25 turning off their transmission chains actually means

1 transceivers leave their transmission chains on?

2 MR. BROWAND: Objection to form.

3 THE WITNESS: Now you're -- I don't know if
4 you're being funny or not, but that's not what I said,
5 and you're mischaracterizing my testimony.

6 BY MR. COOK:

7 Q I'm just trying to understand what "turn off"
8 means.

9 A You've asked me that question many times, and
10 I've stated, turning off the transmission chain means
11 they're not actively sending. It's not related to the
12 circuitry power or the power consumed by the circuitry.
13 Because the rest of that sentence still says you are
14 consuming idle power.

15 But that phrase means you are not actively
16 sending, which is consistent with the entire section and
17 the previous sentence which just says you're still
18 waiting to send.

19 Q Okay. So is there any circuitry in the
20 transceiver that can be turned off and still -- and the
21 transceiver still be consuming idle power?

22 MR. BROWAND: Objection to form.

23 THE WITNESS: I haven't rendered an opinion on
24 that hypothetical. Again, you've asked me similar
25 questions, and the claims describe a first circuit or

1 second circuit. The courts claim construction relates
2 to the first circuit or the second circuit. There
3 isn't -- the claims do not relate to individual
4 components, and so your hypothetical is vague and it's
5 outside the scope of my declaration.

6 BY MR. COOK:

7 Q Is your opinion that all the circuitry in the
8 transceiver has to be on for the transceiver to be
9 consuming idle power?

10 MR. BROWAND: Same objection, Counsel.

11 THE WITNESS: When we go to the claims, the
12 first circuitry is on and ready to send, and that's what
13 makes it consume idle power; and the second circuitry --
14 or the second circuitry is on and waiting to send, and
15 that's what allows it to consume idle power.

16 BY MR. COOK:

17 Q That's the only circuitry that has to be on for
18 it to be consuming idle power?

19 A In the context of the claim language, that's
20 what -- I mean, there's -- that's -- in the context of
21 the claim language and the issues that are relevant to
22 the opinions here, you have a first circuitry and a
23 second circuitry.

24 MR. COOK: Can you open up Exhibit No. 4.

25 (Exhibit 4 was marked.)

1 **THE WITNESS: Yes. I have it open.**

2 BY MR. COOK:

3 Q Do you recognize Exhibit 4?

4 A Yes.

5 Q What is Exhibit 4?

6 A **It is the decision granting institution of this**
7 **IPR.**

8 Q Can you turn to page 25 of the institution
9 decision.

10 A **I'm there.**

11 Q So if you look at the last sentence on page 25,
12 which continues to the top of page 26, it says:

13 "The '120 patent does not appear to define idle
14 power consumption as requiring the circuitry to be
15 powered on while waiting to send data nor exclude
16 circuitry that's powered off while waiting to send
17 data."

18 Do you see that?

19 A **I do.**

20 Q And do you disagree with that statement?

21 A **I disagree in part, yes. I think it doesn't**
22 **make sense to be powered off while waiting to send data.**
23 **So that part of the opinion, I don't think I -- I do not**
24 **agree with, unfortunately. I think the '120 patent does**
25 **define "idle power consumption" as requiring the**

1 circuitry to be powered on while waiting to send data.
2 And I think that's consistent with how a POSITA would
3 understand it. It's consistent with the prosecution
4 history, and it is consistent with how the district
5 court -- district court defined "idle power
6 consumption," both in the preliminary and in the final
7 decision.

8 So I think all the evidence that I have looked
9 at point to a different interpretation than the part of
10 the interpretation that the PTAB took, which also
11 seems -- to just finish my -- and it seems to me that
12 even the board isn't exactly sure. They provided this
13 opinion, but they're not -- because the very last
14 sentence states, "We invite the parties to further
15 address this issue at trial," which lends me to believe
16 that, you know, they may be leaning towards something,
17 but they're not exactly sure or 100 percent confident.

18 Again, I do not want to put words in their
19 mouth. But the very last sentence, when they are
20 inviting the parties to further discuss, I think, they
21 are doing this because I think the evidence is
22 inconsistent with the opinion that they have. At least
23 that's my opinion -- or their preliminary findings. The
24 evidence is inconsistent with their preliminary
25 findings.

1 Q So in particular, you disagree that the
2 '120 patent does not exclude circuitry that is powered
3 off while waiting to send data?

4 MR. BROWAND: Objection to form.

5 (Reporter clarification.)

6 THE WITNESS: In the context of what it means
7 to have idle power consumption, that is correct. When
8 you have idle power consumption, that means that the
9 circuitry is powered on while you're waiting to send
10 data.

11 BY MR. COOK:

12 Q Okay. So you believe the '120 patent excludes
13 circuitry that is powered off while waiting to send
14 data?

15 A When we look at the claim language -- again,
16 the specification -- so when you talk about the patent,
17 I want to make sure that we're pointing to the -- you
18 know, the specification sometimes may describe different
19 embodiments. And then the claim language, different
20 claims may read on different specifications. So when it
21 comes -- my opinions are specifically focused on the
22 challenge claims; and in the context of the challenge
23 claims, when the claims are very clear in terms of the
24 first circuitry and the second circuitry, idle power
25 consumption is when that circuitry is on and you are

1 waiting to send.

2 I am not providing other opinions on other
3 embodiments in the specification unrelated to the
4 claimed -- to the challenge claims.

5 Q Okay. And when you say that circuitry, that
6 has to be powered on, which circuitry are you referring
7 to?

8 A That are being claimed as a first circuitry or
9 a second circuitry.

10 Q So it's the first and the second circuitry --
11 or the second circuitry that have to be powered on?

12 A And waiting to send, to have idle power
13 consumption as the challenge claims state or require.

14 Q Can we go back --

15 A Sorry. Just to be clear: My opinions may be a
16 little bit narrower than what the board stated. Because
17 the board stated that the '120 patent does not appear,
18 and I'm really only focusing on the challenge claims,
19 not specification as a whole. And in the context of the
20 challenge claims, you have a first circuitry and a
21 second circuitry.

22 And so when you're doing claim construction for
23 idle power consumption in the context of the challenge
24 claims, I disagree with this opinion in part because
25 it's inconsistent with all the other evidence.

1 Q Okay. And in your view, the circuitry that's
2 included in the transmission chain has to be on in order
3 for the transceiver to be consuming idle power?

4 MR. BROWAND: Objection to form.

5 THE WITNESS: I'm saying the hardware is on.
6 What's off is the sending. That's how a POSITA would
7 read that phrase. Again, those terms do not appear in
8 the claims so I'm not doing claim construction, and I
9 don't think they affect the claim language. I
10 understand that claims are understood from the point of
11 view of a person of ordinary skill in the art when read
12 in light of the specification.

13 I also understand the specification can
14 describe different embodiments. Not all of them may
15 read on a specific claim. And I also understand you do
16 not import limitations from the specifications into the
17 claims.

18 So taking all of that into account, that phrase
19 in the patent which is -- which I believe is in
20 column 3, which is -- does not change how the claims are
21 clear in terms of the first circuitry and the second
22 circuitry -- in terms of circuitry, need to be powered
23 on and waiting to send to meet the additional limitation
24 of idle power consumption being consumed.

25 ///

1 BY MR. COOK:

2 Q Okay. Let's go to paragraph 52 of your
3 declaration.

4 A I'm there.

5 Q And again, this is discussing that same phrase,
6 "Even if the idling transceivers turn off their
7 transmission chains, some idle power may be consumed."
8 And you say that -- further supports Patent Owner
9 because it confirms that idle power consumption refers
10 to times when the transceivers are idling and thus
11 powered on, in contrast to their transmission chains,
12 which could be powered off.

13 Do you see that?

14 A Yes. Yes.

15 Q So are you saying that the transmission chains
16 can be powered off while the transceivers are on and
17 consuming idle power?

18 A Yes. A transmission chain is a broad term, and
19 that isn't limited to hardware. That includes
20 processes. And so the process of sending is what a
21 person of ordinary skill would understand is powered
22 off. Like, you're not actively sending. You are not --
23 but you have to be waiting to send and powered on to be
24 idle. So it's a clarification of what the specification
25 means when it's describing idle power consumption that

1 you are idling as in you are powered on, but you are not
2 actively sending. Your transmission chains are powered
3 off because they're not actively sending. But the
4 circuitry, it's powered on and it is consuming idle
5 power.

6 Q The processes that you say are part of the
7 transmission chain, where are those processes executing?

8 A They would be processes related to
9 transmission. So they are -- again, the term is not
10 expanded on. It only appears once in the specification.
11 But a POSITA would understand that the processes that
12 are related to transmission would be part of a
13 transmission chain like, you know, when -- an example
14 would be, like, encoding the data for transmission or
15 getting the data ready for transmission. That would be
16 part of that.

17 And Petitioner's expert, I think -- as I state
18 in the next sentence, seems to agree at least with the
19 opinion that transmission chains may be powered off,
20 they're not sending. But the circuitry and the mobile
21 station are certainly powered on, so that is consistent
22 with the opinion that I'm saying, that the plain
23 circuitry are powered on but they're not sending.
24 They're waiting to send. And that's when you would meet
25 the other limitations that are being challenged where

1 you are consuming idle power.

2 Q So earlier today, you testified that a
3 transition chain would be an example of first circuitry
4 or an embodiment of the first circuitry.

5 MR. BROWAND: Objection.

6 THE WITNESS: I said the circuitry that's
7 affiliated with the transmission chain, the first
8 circuitry could be an example. I didn't say it's equal
9 to it or it's limited to it. That was my prior
10 testimony.

11 BY MR. COOK:

12 Q In the context of your opinion in paragraph 52,
13 when the transmission chain is turned off, is the
14 digital-to-analog converter turned on?

15 A I have not provided an opinion one way or the
16 other regarding individual components because I don't
17 need to in the context of the opinions that I have.

18 Q And so when the transmission chain is turned
19 off, you don't have an opinion on whether the filters
20 would be turned on?

21 A I don't have an opinion on that because that
22 would not be relevant to the claim language because
23 those components are not part of the claim language.
24 The claim language is describing a first circuitry and a
25 second circuitry.

1 Q Okay. And do you also have no opinion on when
2 the transmission chain is turned off, whether the mixer
3 is turned on?

4 A The same response would apply. It wouldn't
5 change my opinion either way. The circuitry is on, you
6 are waiting to send. You are not sending yet, but you
7 are waiting to send but you're not actively sending.
8 And that would be consistent with the part of the
9 specification related to transmission chains which we
10 said only appears once. But the rest of the
11 specification doesn't mention transmission chain and
12 more focuses on the terminology that appears in the
13 claims, like the first circuitry and a second circuitry.

14 Q So going to paragraph 56 of your declaration,
15 you state that:

16 "Idle power consumption means power consumed
17 when the mobile station and the first and second
18 circuitry are powered on and waiting to send"; is that
19 correct?

20 A Yes.

21 Q So according to your construction, the first
22 second circuitry cannot be powered off when the mobile
23 station is consuming idle power; is that right?

24 A There are two conditions for it to be consuming
25 idle power. It has to be on; and it has to be waiting

1 to send.

2 Q But under either of those conditions, your
3 construction means that the first and second circuitry
4 cannot be powered off when the mobile station is
5 consuming idle power; is that correct?

6 MR. BROWAND: Objection to form.

7 THE WITNESS: I don't know if you're asking me
8 a negative of my construction. My opinion is in the
9 positive in terms of to be consuming idle power, it
10 means the first and the second circuitry are powered on
11 and they are waiting to send.

12 BY MR. COOK:

13 Q Okay. And if the first or second circuitry is
14 powered off, it is not consuming idle power?

15 MR. BROWAND: Same objection.

16 THE WITNESS: I don't have an opinion on that.
17 If it's powered off, it's powered off. Means it's not
18 waiting to send. You cannot be powered off and waiting
19 to send. That would be inconsistent. So that's the
20 opinion that I have of when it's powered off, you're not
21 waiting to send; and if you're not waiting to send, you
22 would not be consuming idle power that's required by the
23 claim language when you are waiting to send but not
24 sending.

25 ///

1 BY MR. COOK:

2 Q If the transceiver is transmitting in a SIMO
3 mode, would the second circuitry be powered on or off?

4 MR. BROWAND: Objection to form.

5 THE WITNESS: I don't have an opinion on that.
6 It doesn't affect the opinions I have, what the second
7 circuitry is doing when you are in SIMO mode. The
8 claims do not limit, I think, what the other circuitry
9 in that context.

10 BY MR. COOK:

11 Q Okay. You said both the first and second
12 circuitry are powered on in order to be consuming idle
13 power. So I'm just wondering if there's any case where,
14 for example in SIMO mode, the second circuitry could be
15 off and still be consuming idle power.

16 A Well, in SIMO mode, you are focusing on a
17 single circuitry. So the circuitry that's related to
18 SIMO or the circuitry that's feeding the antenna or
19 connected or coupled to the antenna for SIMO is the one
20 that the claims are discussing.

21 Q Okay. The --

22 (Reporter clarification.)

23 BY MR. COOK:

24 Q Let me repeat it. Claim 25 recites first
25 circuitry and second circuitry; correct?

1 A Claim 25 -- does -- yeah, I'm on claim 25. I
2 switched to tab 3 which is the '120 patent. I'm on
3 column 19. So line 4 discusses the first circuitry
4 coupled to a first antenna and line 6 discusses a second
5 circuitry coupled to a second antenna. That is correct.

6 Q Okay. And then the last phrase of claim 25,
7 when it says "an idle power consumption of the mobile
8 station," is that referring -- does that require that
9 both the first circuitry and the second circuitry be
10 powered on?

11 A You need both circuitry to select MIMO. So in
12 MIMO mode, we're in both -- so I'm back to line 13 or
13 12. The claims state you need to select between a MIMO
14 mode wherein both the first and the second antenna
15 transmit data. So you're going to need both circuitry
16 because you need to transmit to both antennas. So in
17 that -- in the context of MIMO, to be idle means both
18 circuitry are on and waiting to transmit, which you
19 require for MIMO.

20 Q Okay.

21 A For SIMO -- I'm sorry. For SIMO -- so I'm now
22 on lines 14 and 15. SIMO mode, we're in only one of the
23 first and second antennas transmit data. So with SIMO,
24 the claim states that you only need one of the first and
25 second antennas, which means you only need one of the

1 first or second circuitry.

2 So to be idle, then the circuitry that's
3 associated with the antenna in SIMO would be on and
4 waiting to transmit to be idle.

5 Q Okay. So that's a little different from your
6 construction, that says first and second circuitry are
7 powered on; correct?

8 MR. BROWAND: Objection to form.

9 THE WITNESS: I disagree that that's different.
10 You need both to be on and waiting to transmit for MIMO
11 which is -- in the context of MIMO, you need both
12 circuitry to be on and waiting to transmit to be -- to
13 be consuming idle power for MIMO.

14 BY MR. COOK:

15 Q Okay. So the fact that in SIMO mode, only one
16 set of circuitry is powered on to transmit doesn't
17 affect the construction of idle power consumption and
18 that still requires both the first and second circuitry
19 be powered on; is that correct?

20 MR. BROWAND: Objection.

21 THE WITNESS: The construction still holds.
22 For SIMO, the claim is only limiting you to the first or
23 second circuitry because you only need one antenna to
24 transmit in SIMO so -- but you have idle power
25 consumption of the mobile station.

1 So again, the last part of the statement, it
2 says "idle power consumption of the mobile station." So
3 it's discussing idle power consumption of the station as
4 a whole. And the mobile station is in an idle power
5 consumption state when the circuitry, first or second,
6 are on and waiting to transmit but not transmitting.
7 Because idle power consumption isn't limited to a -- at
8 least the claim language, it's from the point of view
9 from a mobile station.

10 So when the Court provides a construction, my
11 understanding is you can take that construction and you
12 put it back in the claim language and it has to make
13 sense.

14 So the idle power consumption says "of the
15 mobile station"; not an idle power consumption of a
16 specific piece of circuitry.

17 BY MR. COOK:

18 Q So it would be wrong to say that idle power
19 consumption is the idle power consumption of the first
20 and second circuitry. It would have to be idle power
21 consumption of the mobile station.

22 Is that what you're saying?

23 A I'm saying the claim states "idle power
24 consumption of the mobile station." That's claim
25 language. I'm not offering opinions on it. It is what

1 it is. It's the claim language.

2 MR. BROWAND: Counsel, we've been going about
3 an hour. Good time for a break?

4 MR. COOK: Yeah. We can take a break.

5 --oOo--

6 (LUNCHEON RECESS.)

7 --oOo--

8 BY MR. COOK:

9 Q Dr. Akl, during the breaks, did you discuss any
10 of your testimony with anyone?

11 A No.

12 Q I want to -- well, let me ask you this: Is an
13 idling transceiver that has turned off its transmission
14 chain circuitry still waiting to send?

15 MR. BROWAND: Objection to form.

16 THE WITNESS: Your question is flawed because
17 you put two things in your question that don't make
18 sense. You said an idling transceiver that turned off
19 is waiting to send. So the three don't go together. If
20 it's idling, it's not off. If it's off, it's not
21 waiting to send. So your question -- I can't answer
22 your question as asked because it's flawed. The
23 adjectives you used don't go together.

24 BY MR. COOK:

25 Q Okay. So I asked a little bit different

1 question. I said, is an idling transceiver that has
2 turned off its transmission chain circuitry still
3 waiting to send?

4 MR. BROWAND: Same objection.

5 THE WITNESS: Idling transceiver turned off its
6 transmission chain circuitry. You're adding the word
7 "circuitry" on which I don't know what it means in this
8 context. So the response that I gave you is correct
9 because you've added the word "circuitry" and you said
10 the circuitry is turned off. If the circuitry is turned
11 off, it's not idle and it can't be waiting to send. So
12 the response that I gave is actually correct. Your
13 question is flawed because the adjectives that you've
14 used don't go together.

15 BY MR. COOK:

16 Q Okay. So an idling transceiver must have its
17 transmission chain circuitry on to be waiting to send?

18 A Again, you're using the word "circuitry" which
19 doesn't appear with transmission chain. Those three
20 words don't appear together anywhere. And so I'm not
21 sure what you're pointing to. Either we have a
22 transmission chain or we have transmission circuitry;
23 but, again, your adjectives that you're stringing
24 together don't make sense.

25 Q Okay. So let me just understand. So a

1 transmission chain is separate from transmission
2 circuitry?

3 A Yes.

4 Q So what is -- what is the transmission
5 circuitry?

6 A An example of the transmission circuitry would
7 be like first circuitry or second circuitry, and we have
8 examples of those in the patent. Seems we're going
9 around in circles so we're starting back at figure 4,
10 and 454 -- item 454 or item 460 would be an example of a
11 first circuitry and a second circuitry; and those would
12 be an example of a transmission circuitry.

13 Q And a transmission chain is what?

14 A You've asked me that question before. And I
15 have answered that question. Again, I'm not providing
16 an exact definition. That term appears only once in the
17 patent. I don't think the patent exactly defines what
18 it is. But a POSITA would understand that an example of
19 it would be the processes that would be associated with
20 transmission.

21 Q And is a transceiver capable of turning off the
22 processes associated with transmission?

23 MR. BROWAND: Objection to form.

24 THE WITNESS: Part of the transceiver could. I
25 mean a transceiver has many components. So to the

1 extent you have a control or a processor as part of a
2 transceiver, a -- it may control the transmission chain.
3 Again, that's not explicitly -- I don't think it's
4 explicitly shown in figure 4, but that's how a POSITA
5 would understand those words.

6 BY MR. COOK:

7 Q When the transceiver has turned off its
8 transmission chain, is it consuming only leakage
9 current?

10 A No. Because it's waiting to send. It is
11 consuming -- it's still on and so it is consuming
12 leakage and other current just like being on. So the
13 transceiver circuitry is on, and it's consuming leakage
14 and other power as a result of being on.

15 Q So I want to look back for a minute at
16 Exhibit 4 which is the institution decision. Page 25.

17 A Okay. I'm there.

18 Q We looked at the board's construction there. I
19 just want to make sure I understand the point of
20 disagreement here. The board's construction says power
21 consumption -- excuse me -- "Power consumption during
22 which the transceiver may be waiting to send data,
23 whether the transceiver is on or off." And would you
24 agree that board's construction --

25 A I'm sorry. Before you continue. I'm not sure

1 where you're reading so I didn't want you to finish your
2 question and ask it again. Where are you on page 25?

3 Q I'm sorry. I might have given you the wrong
4 portion. Let me just check. It's in the last paragraph
5 of page 25. It says -- the second sentence starts:

6 "Specifically, we preliminarily interpret idle
7 power consumption as including power consumption during
8 which the transceiver may be waiting to send data
9 whether the transceiver is on or off."

10 The board's construction would include
11 transceiver that was off but waiting to send data;
12 correct?

13 A To me, that does not make sense; so it's a
14 conflict. You cannot be off and waiting to send data;
15 so I would disagree with that.

16 Q I understand you have a disagreement. You're
17 saying that a transceiver that's off is not waiting to
18 send data; but if there were a transceiver that was off
19 and waiting to send data, that would fall within the
20 board's construction.

21 Do you agree?

22 MR. BROWAND: Objection to form.

23 THE WITNESS: I don't have an opinion on it
24 because I don't believe that's a valid hypothetical.

25 ///

1 BY MR. COOK:

2 Q Okay. And the board's construction would
3 exclude a transceiver that was off and not waiting to
4 send data; correct?

5 A The board's construction would exclude a
6 transceiver that is off because the first part says
7 "Waiting to send." So if it's not waiting to send, it
8 would be excluded; and I think what the board is -- it's
9 almost agnostic to the power of the transceiver. So the
10 board is basically only ending up with a single
11 condition instead of two conditions. Because they are
12 equating idle power consumption with only waiting to
13 send data, and it doesn't matter if the transceiver is
14 on and off. So I would disagree with that.

15 So anything that is not waiting to send would
16 be excluded. It would also exclude -- it doesn't matter
17 if the transceiver is on and off. So it's limiting you
18 to -- essentially to one condition.

19 Q So a transceiver that's off and not waiting to
20 send data would be excluded from that construction;
21 correct?

22 A It doesn't matter the power level of the
23 transceiver. The fact that if it's not waiting to send
24 would be excluded, whether it's on or off based on the
25 board's claim construction.

1 Q Okay. So we talked about this earlier. But in
2 your declaration in paragraph 56, you said you -- that
3 the idle power consumption could also be construed in a
4 manner consistent with the preliminary claim
5 construction of the district court?

6 A Yes.

7 Q And you said that's still your opinion;
8 correct?

9 A Yes. And since my declaration, the final
10 opinion released and my opinions are consistent with the
11 final district court's opinion of -- where basically the
12 idle power consumption of the mobile station is just the
13 power consumption -- the power consumed by the mobile
14 station when the mobile station is powered on and
15 waiting to send. So that's, I believe, is a correct --
16 because it's taking into account the mobile station
17 being on and waiting to send. And the adjectives make
18 sense because the claim language uses power consumption
19 of the mobile station, which the district court took
20 into account by saying the power consumed by the mobile
21 station when you plug it back in. And it has to be
22 powered on and it has to be waiting to send.

23 So those are all -- the preliminary, the final,
24 and the opinion that I have here are all consistent that
25 the circuitry or the mobile phone has to be on and

1 waiting to send.

2 Q Okay. So it's your opinion that the district
3 court's construction requires the circuitry of the
4 mobile phone to be on?

5 A The court's claim construction doesn't
6 specifically use the word "circuitry." It says "a power
7 consumed" -- and I'm looking at Exhibit 6, which you
8 provided me and I'm on page 16. It says:

9 "An idle power consumed of the mobile station,
10 which is claim 25, to be a power consumed by the mobile
11 station when the mobile station is powered on and
12 waiting to send."

13 MR. COOK. Could you go to Exhibit 5.

14 THE WITNESS: I'm in Exhibit 5, I have it
15 ready.

16 (Exhibit 5 was marked.)

17 BY MR. COOK:

18 Q Okay. And Exhibit 5 is the court -- district
19 court's preliminary construction; is that correct?

20 A Yes.

21 Q And on page 1 of Exhibit 5, item C, is a
22 district's court's preliminary construction that says:

23 "The idle power consumption of the mobile
24 station means power consumed by the first and second
25 circuitry when the mobile station is powered on and able

1 for transmitting but waiting to send."

2 And you agree with that construction?

3 A Yes. It's very similar to the final
4 construction, and I agree with both. I think the
5 "enabled for transmitting" isn't really necessary
6 because you're waiting to send; and if you're waiting to
7 send, in effect, you're enabled for transmitting. So
8 that phrase doesn't appear in the final construction. I
9 don't think it's necessary.

10 The other change is they -- the court changed
11 "first and second circuitry" to "mobile station," which
12 makes sense because the claim says "idle power of the
13 mobile station" so it's not being limited. And so the
14 final construction is a little -- makes more sense when
15 you plug it into the claim itself. But I think the
16 opinion or the -- the important part of you need two
17 conditions of being powered on and waiting to send is
18 the same in both, which is still the opinion that I have
19 in my declaration.

20 Q Okay. Let me ask about each of those. Now,
21 the district court's preliminary construction would
22 include power consumed by a mobile station waiting to
23 send in which the first and second circuitry are powered
24 off, wouldn't it?

25 A Can you repeat the question?

1 Q Sure. The district court's preliminary
2 construction of idle power consumption would include
3 power consumed by a mobile station waiting to send in
4 which the first and second circuitry are powered off;
5 correct?

6 A I --

7 MR. BROWAND: Objection to form.

8 THE WITNESS: I don't understand the question.
9 The district court's preliminary construction says power
10 is on and waiting to send. Not powered off.

11 BY MR. COOK:

12 Q The preliminary construction says when the
13 mobile station is powered on. It doesn't say the first
14 and second circuitry are powered on, does it?

15 A It says first and second circuitry -- when the
16 motion is powered on. Now I understand the nuance of
17 your question.

18 Can you ask it again, please.

19 Q Sure. So would the district court's
20 preliminary construction of idle power consumption
21 include power consumed by a mobile station waiting to
22 send in which the first and second circuitry are powered
23 off?

24 MR. BROWAND: Objection to form.

25 THE WITNESS: The answer is no because if

1 they're powered off, they wouldn't be waiting to send.

2 So that wouldn't make sense.

3 BY MR. COOK:

4 Q Okay. So there's no way a mobile station
5 waiting to send could have first and second circuitry as
6 powered off?

7 A In the context of this patent, that is an
8 opinion and the limitations here. That is -- you cannot
9 be waiting to send and not powered on. That's why it's
10 explicit and it makes sense to have both to be very
11 clear that you have to be on and waiting to send.

12 Q Okay. But again, the district court's
13 preliminary construction only expressly requires that
14 the mobile station is powered on; correct?

15 A The language is what it is. The claim language
16 says "idle power consumption of the mobile station." So
17 the claim language is describing the requirement that
18 you have to have idle power consumption of the mobile
19 station and to have idle power consumption of the mobile
20 station, you need to have the mobile station on and you
21 need to be waiting to send.

22 Q And the court's preliminary construction also
23 refers to power consumed by the first and second
24 circuitry.

25 Do you agree that's the proper construction?

1 A In the preliminary construction, it said "power
2 consumed by the first and second circuitry." That's
3 fine. I agree with the construction, and I think they
4 tweaked it in the final which is fine also. I think
5 because how the claim is structured and the claim is
6 talking about the idle power consumption of the mobile
7 station, the final construction is accurate and it's
8 more -- I think in a way it's considering the claim
9 language more carefully. But either is correct. And I
10 agree with both, and I think my opinions are consistent
11 with both.

12 Q The court's final construction that instead
13 changes that to power consumed by the mobile station
14 instead of the first and second circuitry is a little
15 more accurate?

16 A Well, you did have -- again, you're reading
17 parts of phrases. So it's -- I think the way you
18 phrased your question is inaccurate because it doesn't
19 exactly reflect the difference. The preliminary says
20 "power consumed by the first and second when the mobile
21 station is powered on." The -- and then it says
22 "enabled for transmitting but waiting to send."

23 And the final says "a power consumed by that
24 mobile station when the mobile station is powered on and
25 waiting to send." So I think -- I agree with both. I

1 did not have the final when I wrote my declaration
2 because it wasn't out yet. I only had the preliminary.
3 And both are -- I agree with both opinions that they
4 reflect how a POSITA would understand the claims in
5 light of the specification and they take into account
6 the prosecution history and the intrinsic evidence.

7 Q Okay. And you agree with both the preliminary
8 construction and the final construction from the
9 district court; correct?

10 A Yes.

11 Q So the preliminary construction includes the
12 phrase "enabled for transmitting," which you mentioned
13 before?

14 A Yes.

15 Q What's the significance of "enabled for
16 transmitting"?

17 A I mean, you're asking me to provide an opinion
18 on a preliminary construction. I don't have that
19 analysis done; but I can tell you, comparing the
20 preliminary to the final, it's not necessary to have
21 those. I think it's trying to stress that you are
22 waiting to send but you're not sending so you're able
23 to -- transmitting but you're not transmitting yet. And
24 it's just a little too wordy. And I think the final is
25 more succinct, but they both mean the same thing.

1 Q Is it your opinion that there's no significance
2 to the fact that the court removed the phrase "enabled
3 for transmitting" from the final construction?

4 A I have not provided a critique of the board's
5 claim construction, if that's what you're asking me. I
6 can tell you that I agree with both opinions, and
7 they're both consistent with the opinions that I have in
8 my declaration.

9 MR. COOK: Can you go to Exhibit 6.

10 THE WITNESS: Yes. I'm there.

11 (Exhibit 6 was marked.)

12 BY MR. COOK:

13 Q And Exhibit 6 is the court's -- the district
14 court's claim construction order. Have you seen this
15 document before?

16 A I have after I wrote my declaration.

17 Q Can you turn to page 12, where the Court is
18 discussing the "idle power consumption" term.

19 A I'm there.

20 Q So here, as you referred to before, the Court's
21 construction which is at the bottom of page 12, is "A
22 power consumed by the mobile station when the mobile
23 station is powered on and waiting to send."

24 Did I read that correctly?

25 A Yes. Yes.

1 Q At the top of that paragraph, it says:

2 "The court agrees with Empire that a fully
3 powered off mobile station does not have idle power
4 consumption within the meaning of the claims."

5 Do you agree with that statement?

6 A I haven't provided an opinion on it; but
7 sitting here today, it is consistent with how a POSITA
8 would understand that if something is fully powered off,
9 it's not idle.

10 Q And then the next sentence says:

11 "Nor must all the circuitry of the mobile
12 station be turned on for it to be idle."

13 Do you agree with that sentence?

14 MR. BROWAND: Objection to form.

15 THE WITNESS: I haven't provided an opinion on
16 it. I don't have a critique of it one way or the other.
17 BY MR. COOK:

18 Q So you don't agree or disagree with that
19 sentence, "Nor must all the circuitry of the mobile
20 station be turned on for it to be idle"?

21 MR. BROWAND: Same objection.

22 THE WITNESS: I don't -- sorry, I'll wait for
23 you to finish your objection. I think there's an
24 objection to form.

25 And then my response is I have not provided an

1 opinion on it.

2 BY MR. COOK:

3 Q And sitting here today, you don't have any
4 opinion on that sentence?

5 A That's fair. My understanding is as an expert,
6 and I'm also an expert in the district courts, when the
7 courts provides an opinion regarding claim construction,
8 all the parties agree to it and use it and adopt it and
9 the discussion is over. So I would not provide an
10 opinion on a final court's claim construction. I have
11 not in the past, and I would -- that's not something you
12 would do as an expert. That's when the dispute, at
13 least as far as the -- you know, my role would be just
14 to adopt the court's claim construction.

15 Q And so have you -- do you also adopt that
16 statement, "Nor must all circuitry of the mobile station
17 be turned off for it to be idle," as part of your
18 opinion in this IPR?

19 MR. BROWAND: Objection to form.

20 THE WITNESS: That statement -- that statement
21 is part of the discussion and not part of the final
22 claim construction. Again, my understanding is the
23 court's construction, which is on pages 16 and 17, are
24 what is adopted. I'm not a legal expert, and I don't
25 have an opinion about the body of the order; but my

1 understanding is if you go to page 16 and 17, and you
2 look at the disputed term and the court's construction,
3 those are the constructions that you adopt, and they are
4 no longer up for discussion, is my understanding.

5 BY MR. COOK:

6 Q Do you agree that the court's construction on
7 pages 16 and 17, at least the one that applies to an
8 "idle power consumption of the mobile station," is that
9 consistent with the statement that all the circuitry of
10 the mobile station does not have to be turned on for it
11 to be idle?

12 A I don't have an opinion on that.

13 MR. COOK: Could you take a look at Exhibit 7.
14 (Exhibit 7 was marked.)

15 THE WITNESS: Yes. I have it open.

16 BY MR. COOK:

17 Q Have you seen Exhibit 7 before?

18 A I don't think so.

19 Q So Exhibit 7 is the Markman transcript from the
20 district court. Could you turn it over to page 24.

21 A I'm there.

22 Q I want to ask about the "enabled for
23 transmitting" language that the court removed from its
24 final construction. If you look at the -- I guess the
25 first full paragraph on the page starting at line 8, it

1 says:

2 "And then pointing to the 'enabled for
3 transmitting' portion the court's preliminary
4 construction, the "enabled for transmitting" language
5 adds language to the construction that's not founded or
6 based on the specification. And to the extent that
7 'enabled for transmitting' could be read to require the
8 transceiver be powered on, that's contrary to the
9 specification which specifically contemplates the
10 transceiver circuitry being powered off."

11 Do you see that statement?

12 A I see those words, yes.

13 Q Do you disagree with that statement?

14 A I don't have an opinion on it. That statement
15 was not made by the court. My understanding, it was
16 made by Ms. Gore. I don't know who that is.

17 Q That's one of Samsung's attorneys. So this was
18 Samsung's argument about the "enabled for transmitting"
19 language.

20 A So you're asking me whether I agree with an
21 attorney that Samsung said something during a Markman?
22 Is that the point of your question?

23 Q That was what I asked, yes.

24 A I don't have an opinion on that.

25 Q So the fact that the Court removed "enabled for

1 transmitting" from the final construction, do you have
2 an opinion on what that -- what significance of removing
3 "enabled for transmitting" is?

4 MR. BROWAND: Objection to form. Asked and
5 answered.

6 THE WITNESS: No. I -- previously I had said
7 that I don't think it's necessary because if you're
8 waiting to send, means you are somewhat enabled to
9 transmit, and it adds extra language and it adds a
10 "but." And usually -- you know, negatives or buts in
11 court's claim construction are frowned upon. Again,
12 I'm -- you know, so I think the final construction is
13 more succinct; but I don't have an opinion other than
14 it's not necessary.

15 Because if you're waiting to transmit, you
16 know, you intend to be enabled to transmit as you're
17 waiting to transmit. You're ready to transmit but
18 you're not transmitting. That's consistent with what
19 the specification says, that you are not transmitting
20 but you're waiting to transmit. So saying something is
21 enabled is adding an extra layer that is not necessary.

22 BY MR. COOK:

23 Q So generally, "enabled for transmitting" would
24 mean that the transceiver would have to be powered on;
25 correct?

1 MR. BROWAND: Objection to form.

2 THE WITNESS: Not necessarily. I don't have an
3 opinion on that.

4 "Waiting to transmit" means you're on and
5 you're waiting to transmit. So it is consistent that
6 when you're waiting to -- you're on and you're waiting
7 to transmit.

8 (Reporter clarification.)

9 BY MR. COOK:

10 Q Sorry.

11 A Let's start with a fresh question.

12 MR. COOK: Okay. Why don't we move on here.
13 Let's go to Exhibit 8.

14 (Exhibit 8 was marked.)

15 THE WITNESS: I have Exhibit 8 open.

16 BY MR. COOK:

17 Q Okay. And do you recognize Exhibit 8?

18 A Yes.

19 Q And what is Exhibit 8?

20 A It is publication number U.S. 2006/0067263,
21 which we refer to in this proceedings as Li, L-i.

22 Q Okay. So if I refer to the "Li reference,"
23 you'll understand that I'm referring to this Exhibit
24 No. 8?

25 A Yes. It's also Exhibit 1005 in the IPR, which

1 I think is better to just -- instead of calling it
2 Exhibit 8, it's better to call it Exhibit 5. It's
3 tab 8. Just so that we don't have to renumber the
4 exhibits in this proceeding. We just go with the
5 exhibit numbers in the IPR. Normally that's less
6 confusing.

7 Q Fair enough. I'll try to refer to it as
8 Exhibit 1005 or the "Li reference."

9 This is -- so the Li reference is one of the
10 references you discuss in your declaration?

11 A Yes. It's a reference that is a piece of prior
12 art that Petitioner brought forward.

13 Q So we go back to your declaration, go to
14 paragraph 60.

15 A I'm there.

16 Q And you're discussing the Li reference here and
17 you say that -- at paragraph 60 of your declaration, you
18 point out that in paragraph 18 of Li, Li is stating
19 that:

20 "A station in idle mode waiting for incoming
21 signals making approximately 60 percent of its battery
22 energy" and that "a station may use less than 20 percent
23 of its battery energy for communicating actual traffic."

24 Do you see that?

25 A Yes.

1 Q So Li is pointing out a problem here that the
2 idle -- idle power consumption is a problem; correct?

3 MR. BROWAND: Objection to form.

4 THE WITNESS: The -- I mean, Li makes the
5 statement; then, in the next paragraph, it's -- I'm
6 saying exactly what problems the embodiments in Li are
7 trying to solve.

8 BY MR. COOK:

9 Q Okay. And what are Li's embodiments trying to
10 solve?

11 A That's specified in paragraph 19. So we can go
12 to Li and we can go to paragraph 19; and it's been
13 describing paragraph 19, it's saying some embodiments
14 may solve this and other problems, and in one
15 embodiment, for example, and it's describing that
16 embodiment that I also describe in paragraph 61.

17 Q And so -- in Li's paragraph 19, when it refers
18 to this and other problems that its -- that its
19 embodiments are solving, it's referring to the problems
20 identified in paragraph 18, about idle power
21 consumption; is that correct?

22 MR. BROWAND: Objection to form.

23 THE WITNESS: Paragraph 19 is after paragraph
24 18. Paragraph 18 states:

25 "One problem associated with wireless

1 communication using carrier sense collision detection
2 techniques is power consumption. And then it gives an
3 example of idle power waiting for an incoming signal,
4 which is the quote that I cited and then it says:

5 "The power consumed by low-noise amplifier
6 analog-to-digital converters may be multiplied by the
7 number of antennas"; and then it gives another statement
8 that I also cited.

9 BY MR. COOK:

10 Q Okay. So -- and those problems discussed in
11 paragraph 18 are what Li is referring to as the problems
12 in paragraph 19 that its embodiments solve; correct?

13 A That's fair that 19, when it's saying "this and
14 other problems," a POSITA would understand -- again,
15 that's the flow of the discussion, what's in 18.

16 Q So in particular, Li is saying that its
17 embodiments solve the problem of idle power consumption
18 among perhaps some other problems; correct?

19 A I wouldn't phrase it that way. I wouldn't
20 resummarize what's stated, but we have read what's in
21 18.

22 Q Okay. Let's go back to your declaration.

23 A Okay. I'm there.

24 Q In paragraph 61, you're describing the
25 embodiments that may solve this and other problems; is

1 that right?

2 **A Again, I'm citing to paragraph 19, and I'm**
3 **citing to an example that Li cites to.**

4 **Q In this example, you quote.**

5 "AP110, operating in a MISO or SISO operating
6 mode may send a request over wireless shared media 160
7 to switch STA 120 and STA 150 to a SIMO or MIMO
8 operating mode and power consumption for STA 120 and STA
9 150 may be reduced."

10 Is that correct?

11 **A Yes.**

12 **Q So by performing this mode-switching operation,**
13 **is Li addressing the problem of idle power consumption?**

14 MR. BROWAND: Objection to form.

15 **THE WITNESS: It is addressing power**
16 **consumption.**

17 BY MR. COOK:

18 **Q Is it addressing idle power consumption?**

19 **A I don't refer to "idle power consumption" in**
20 **this paragraph.**

21 **Q No, but paragraph 18, I believe, refers to idle**
22 **power consumption; correct?**

23 MR. BROWAND: Objection to form.

24 **THE WITNESS: No. I think you're**
25 **mischaracterizing 18. 18 refers to "idle mode" but**

1 doesn't refer to "idle power consumption." So I think
2 you're mix-and-matching phrases in 18. The word "idle"
3 is "idle mode" in paragraph 18, and idle power does not
4 appear anywhere in Li.

5 BY MR. COOK:

6 Q Do you agree that idle power consumption is the
7 power consumed by a device that's in idle mode?

8 A I don't -- I mean -- I don't specifically have
9 an opinion on that, I didn't address that. But that's
10 not what's in 18. 18 is concerned with power
11 consumption, not being limited or focusing on idle power
12 consumption. Those words don't appear in Li. And the
13 word "idle" actually only appears in Li once in the
14 entire reference in the context of idle mode.

15 Q Let's see. In paragraph 61 of your
16 declaration, you reproduce figure 1 from Li?

17 A Yes. Because a discussion -- sorry. You're
18 referring to that figure analysis and we discuss
19 figure 2 in the next section, next paragraph.

20 Q And in figure 1, Li's block AP110, is an access
21 point; is that right?

22 A That is -- Li does say AP110 may comprise a
23 wireless access point.

24 Q And the blocks labeled "STA" are mobile
25 stations, for example, a mobile telephone?

1 A STA is a station. That's what "STA" stands
2 for. And I think a telephone or a cellular telephone
3 can be examples, yes.

4 Q And Li states at paragraph 14 that STA -- the
5 STAs could be, for example, a mobile or cellular
6 telephone?

7 A Among other things, yes.

8 Q Let's go to paragraph 88 of your declaration.

9 A Okay, I'm there.

10 Q So you state here that Li teaches a base
11 station that may request their mobile device switches
12 operating mode?

13 A Yes.

14 Q And you also state that "reduced power
15 consumption may be the result of the mode selection"?

16 A That's part of the sentence, next sentence,
17 yes.

18 Q But then you say Li is not -- or does not
19 specify that the selection is in accordance with the
20 control signal, based at least in part on idle power
21 consumption?

22 A Correct.

23 Q But you agree that Li's does state that its
24 embodiments solve the problem of power consumption?

25 A I agree that it's looking at reduced power

1 consumption. But Li does not provide any criteria how
2 the switching is related to idle power consumption,
3 which is what the claim language requires. So it's not
4 disclosing a challenge or a limitation from the channel
5 claim. It's disclosing something different.

6 Q Okay. But idle power consumption is a problem
7 that Li identified -- or let me rephrase that.

8 Power consumption during idle mode is a problem
9 that Li identified as a problem in paragraph 18;
10 correct?

11 A Idle mode is one example, and the only time the
12 term "idle" appears in the entire claim that I can agree
13 to -- sorry, in the entire specification or the entire
14 reference. And it's not tied specifically to idle power
15 consumption.

16 Q Do you agree that Li's embodiments are directed
17 to solving the problem of power consumption during idle
18 mode?

19 MR. BROWAND: Objection to form.

20 THE WITNESS: I can agree that it is interested
21 in reducing power consumption, but it is not tied or
22 discusses idle power consumption; and definitely it's
23 not using it as a criteria for a control signal that
24 would be based in part on idle power consumption which
25 is what the claims record.

1 BY MR. COOK:

2 Q So let's go back to Li for a minute and look at
3 paragraph 18.

4 So the example that Li gives is that a station
5 in idle mode may consume approximately 60 percent of its
6 battery energy.

7 So that's referring to the power that's
8 consumed while the station is idling; is that right?

9 A Yes. And that's on the station side. Because
10 the -- so the answer to your question is yes; but again,
11 you know, that's unrelated to the control signal that's
12 coming from the base station which has -- which is not
13 affiliated with or determined on the idle power
14 consumption at the station. So...

15 Q Okay. So are you saying that paragraph 18
16 applies only to -- I'm sorry. Maybe I'm
17 misunderstanding what you're saying.

18 Does paragraph 18 apply to the mobile station?

19 A Paragraph 18 is stating that it's describing in
20 idle mode waiting for an incoming signal. So it's not
21 describing where you're in idle mode ready to transmit.
22 So it's describing something else. It's a different
23 type of idle mode unrelated to when you're trying to
24 transmit. It's referring to idle mode when you're
25 waiting for an incoming signal, what happens. So it's a

1 station waiting for a signal from the access point in
2 that sort of idle mode, it's describing what happens;
3 and that's a very different scenario because this is in
4 receiver mode. You're idle and waiting for an incoming
5 signal. So idle in reception, which is a very different
6 scenario than the '120 patent which is describing
7 waiting to transmit, not waiting to receive.

8 MR. COOK: Okay. Let me ask you to open up
9 Exhibit 9 for a minute.

10 (Exhibit 9 was marked.)

11 THE WITNESS: Yes, I have it open.

12 BY MR. COOK:

13 Q Do you recognize Exhibit 9?

14 A Yes, sir.

15 Q And Exhibit 9 is also marked Exhibit 1006 in
16 the IPR.

17 What do you recognize Exhibit 1006 as?

18 A It's an article titled "Adaptive multiantenna
19 power control in wireless networks." And the first
20 author's last name is Siam, S-i-a-m. And so we either
21 go by it's Exhibit 1006 or the "Siam reference."

22 Q And this is another one of the references that
23 you've discussed in your declaration?

24 A Yes, it is a reference that Petitioner
25 identified.

1 Q So if we can go back to your declaration at
2 paragraph 64.

3 A I'm there.

4 Q So at paragraph 64, you're discussing this Siam
5 reference. And stating that Siam disclosing the
6 protocol called E-BASIC for adjusting the transmission
7 mode to minimize the total energy consumption.

8 Is that right?

9 A Yes, it's all caps; capital E, dash,
10 capital B-A-S-I-C.

11 Q And in paragraph 64, you also reproduce an
12 equation from the Siam reference, and that includes
13 consideration of power consumption of the DAC mixer and
14 low-noise amplifier, among other circuitry components;
15 is that right?

16 A That's fair. The full list is in paragraph 64.

17 Q And those elements are all -- they're all
18 circuit elements that are parts of the transceiver?

19 A Yes. I mean they should be, but yes.

20 Q So Siam is discussing optimizing -- optimizing
21 the transmission mode by considering the circuit power
22 consumption; correct?

23 MR. BROWAND: Objection to form.

24 THE WITNESS: It's describing dynamically
25 adjusting the transmission mode that will -- on a

1 per-packet basis to minimize the total energy
2 consumption.

3 BY MR. COOK:

4 Q So if you could move down to paragraph 83 of
5 your declaration. I wanted to understand your argument
6 here that a POSITA would not have been motivated to
7 combine Li and Siam. You state here in paragraph 83
8 that:

9 "Li does not suggest any need to improve its
10 mode selection system."

11 What do you mean by that?

12 A So my understanding of legal principles is that
13 in order to avoid hindsight bias which I believe
14 Petitioner is doing, you have to put yourself in the
15 shoes of a POSITA looking at a single reference, being
16 able to identify a problem that still exists and a hook
17 that would make the POSITA look at another reference to
18 be used in combination, be motivated to combine both
19 references that's going to solve that problem.

20 And it's my opinion that the problem identified
21 by Li is solved by Li. So Li is not discussing an
22 open-ended problem that's left unsolved that provides a
23 hook for a POSITA that a POSITA would combine it with
24 another reference. So my understanding is a POSITA
25 would combine two pieces of art when looking at those

1 two pieces in a vacuum and not using hindsight bias for
2 the '120 patent as a recipe.

3 That is not the case here because Li is
4 discussing the problem that it solves, and so it's done.
5 Li states that the disclosed embodiments solve the power
6 consumption, and so it's not an open-ended problem that
7 a POSITA would then use Li and try to find a fix to the
8 problem in Li by looking at another reference. Li is
9 self-contained by discussing a solution and solving
10 that -- the issues it's addressing. That's what that
11 sentence means.

12 Q So because Li is already disclosing solving the
13 problems it identifies in paragraph 18 by switching the
14 stations to a SIMO or MIMO mode, there's no need to
15 combine with Siam.

16 Is that your argument?

17 A My argument is without using hindsight bias,
18 which is what Petitioner and Petitioner's expert did, a
19 POSITA would not have found it obvious or would not have
20 combined Li and Siam for the reasons I give in this
21 section.

22 Q Now, Siam doesn't address idle power
23 consumption; correct?

24 A No, there is no mention of idle power in Siam.
25 Neither is in Li but that's correct.

1 Q Going back to the Li reference. Can you turn
2 to figure 2?

3 A I'm there.

4 Q So in figure 2, Li discloses a device 200 which
5 it says can be an example of a mobile station; correct?
6 And I think that's at paragraph 20.

7 A Can you repeat your question, please.

8 Q Device 200 depicted in Li's figure 2 can be an
9 example of a mobile station?

10 A I don't think 200 on its own is an example of a
11 mobile station. I believe paragraph 20 is stating that
12 node 200 may be implemented as part of an access point,
13 a station, that are described in figure 1.

14 Q And Li's device 200 includes two transmitters,
15 240A and 240B; is that right?

16 A Yes. Paragraph 21 does disclose two
17 transmitters, 240A and 240B.

18 Q And Li's device 200 also includes two
19 receivers, 250A and 250B?

20 A Yes.

21 Q And device 200 also includes a media access
22 control or MAC processor, 210?

23 A Yes.

24 Q And the device 200 also includes a switch, 220;
25 is that right?

1 A Yes.

2 Q So in paragraph 24, Li discloses that the Mac
3 may receive a PPDU signal in response to which it may
4 cause the MIMO system to switch between a first
5 operating mode and a second operating mode in response
6 to the receiver control signal; is that right?

7 A Is there -- there aren't line numbers.

8 One second. Can you repeat your question,
9 please.

10 Q Sure. So in paragraph 24, Li says that:
11 "MAC 210 may help a receiver control signal in
12 response to a received PPDU."

13 A Yes.

14 Q And "A receiver control signal may cause the
15 MIMO system 230 to switch between a first operating mode
16 and a second operating mode in response to the receiver
17 control signal."

18 A Yes.

19 Q And this is one of Li's embodiments that solves
20 the problem he identifies in paragraph 18; correct?

21 A This is a control signal that makes you switch.
22 This control signal is not based on idle power
23 consumption, which is what the claim requires. So I'm
24 not disputing there is a control signal; I'm disputing
25 that Li teaches the control signal that causes a station

1 to switch is based on idle power consumption, which is
2 what the claims require.

3 Q But the embodiment there that causes the
4 receiver to switch modes is a response to the problem
5 that Li identifies in paragraph 18 of consuming
6 approximately 60 percent of its battery energy in idle
7 mode.

8 Would you agree?

9 MR. BROWAND: Objection to form.

10 THE WITNESS: I disagree with your
11 characterization of how the control signal -- with the
12 disclosure of what the control signal teaches. So it's
13 my opinion that the control signal in Li does not teach
14 a POSITA that it is based in part on idle power
15 consumption. There is nothing in Li that discusses that
16 jump that you're trying to make.

17 BY MR. COOK:

18 Q Is the control signal that switches modes
19 trying to address the problem of idle power consumption?

20 MR. BROWAND: Objection to form.

21 THE WITNESS: No. There is no idle power
22 consumption discussion in Li.

23 BY MR. COOK:

24 Q Is the control signal described in paragraph 24
25 trying to address a problem of power consumption in idle

1 mode?

2 MR. BROWAND: Objection to form.

3 THE WITNESS: No, the idle mode here is this
4 idle mode where you're waiting for an incoming signal.
5 So it's a different type of idle. It's not waiting to
6 transmit. So it does not -- so I would disagree that's
7 what it teaches.

8 MR. COOK: Let's turn to paragraph 75 of your
9 declaration.

10 THE WITNESS: Before we go to that: We've been
11 going for about an hour. Is this a good time for a
12 ten-minute break?

13 MR. COOK: Yeah, that's fine. Let's go ahead
14 and break for ten minutes.

15 (Recess.)

16 BY MR. COOK:

17 Q Doctor, before the break, I was asking you to
18 turn to page -- sorry, paragraph 75 of your declaration.

19 A I'm there.

20 Q So in paragraph 75, you mention that Li is a
21 patent publication, while Siam is an article that
22 describes simulations performed by the study's authors.

23 Do you see that?

24 A Yes.

25 Q And you state that:

1 "Siam does not disclose the physical system or
2 apparatus and that the authors did not build a physical
3 realization of the simulations they performed."

4 Is that right?

5 A Yes.

6 Q In reaching your conclusions about validity,
7 did you assume that prior art references must have a
8 corresponding physical realization in order to be
9 considered in prior art accommodations?

10 A No.

11 Q I'm sorry. What was your response?

12 A My answer is no to your question.

13 Q What's the significance of the fact that Siam
14 doesn't have a physical realization?

15 A It's part of my opinion, that again, it's a --
16 they are disclosing a problem. That they're solving
17 through simulation and it's done. There's no evidence
18 that a POSITA would look at Siam's teaching and be
19 motivated to combine it with Li without using hindsight
20 bias.

21 Q And how does that relate to the fact that
22 there's no physical real investigation of Siam?

23 A It's a simulation in vacuum.

24 Q Let's go to paragraph 94 of your declaration.

25 A I'm there.

1 Q So paragraph 94, you say a POSITA would not
2 have combined Li and Siam because Li disclosed a
3 wireless communication system, and Siam is an academic
4 paper, not a software protocol that was done on a
5 computer as a simulation?

6 A Yes.

7 Q So in reaching your conclusions about validity,
8 did you assume that a software protocol modeled as a
9 software as a computer simulation could not be
10 implemented in a physical system?

11 A No.

12 Q So why is the fact that it was done on a
13 computer as a simulation make it not combinable with Li?

14 A A POSITA would not have looked at both without
15 using hindsight. That's the point is -- again, it's a
16 self-contained academic paper on a simulation describing
17 a problem and solving it and it's self-contained.
18 There's no hope to combine each of the two references
19 without hindsight bias.

20 Q So if Siam had been implemented as a physical
21 system, would that have changed your opinion?

22 A Not necessarily. That's not the point that I'm
23 making. The point that I'm making is that's another
24 reason. It's one reason of why they're different and
25 they're self-contained. I'm not applying a legal

1 principle, per se. I'm just describing what the
2 references are.

3 Q Let's turn to the Siam reference.

4 And I'd like to look at -- it's the third
5 sentence of the abstract starting with --

6 (Reporter clarification.)

7 BY MR. COOK:

8 Q Starting with the phrase "In this paper." So
9 it says --

10 A I'm there.

11 Q "In this paper, we propose a power-controlled
12 channel access protocol for MIMO capable wireless LANs
13 with two antennas per node."

14 Do you see that statement?

15 A I do.

16 Q Would you agree that Li discloses a
17 MIMO-capable wireless LAN that includes mobile stations
18 having two antennas per node?

19 A What was the question again?

20 Q Would you agree that Li discloses a
21 MIMO-capable wireless LAN including mobile stations
22 having two antennas per node?

23 A Yes.

24 Q If a POSITA were interested -- if a POSITA
25 reviewing the Siam reference were interested in learning

1 more about the systems described here in Siam and their
2 applicability, would it have been reasonable to consider
3 other papers and publications by Siam and his coauthors?

4 MR. BROWAND: Objection.

5 THE WITNESS: Yes.

6 BY MR. COOK:

7 Q Would it also have been reasonable for a POSITA
8 to consider papers cited by the Siam paper?

9 A Yes.

10 Q And on the first page of the Siam reference, do
11 you see the name of the last author was this Shuguang,
12 Cui, C-u-i?

13 A Yes.

14 Q If you turn to the last section, Section 6
15 titled "References."

16 Do you see his Reference 4, Siam sets a paper
17 by S. Cui, A.J. Goldsmith, and A. Bahai?

18 A I do see that. Yes.

19 Q And does Reference 5, Siam cites another paper
20 by those same three authors?

21 A Yes.

22 MR. COOK: Can you take a look at Exhibit 10.
23 (Exhibit 10 was marked.)

24 THE WITNESS: I'm there.

25 ///

1 BY MR. COOK:

2 Q Do you recognize this exhibit?

3 A Yes.

4 Q What is this exhibit?

5 A This is Exhibit 1007, submitted by Petitioner,
6 titled "Modulation optimization under energy
7 constraints."

8 And we've been calling it "koo-wee," but I
9 guess it's "soo-wee." I don't know the correct
10 pronunciation. Either way, it's C-u-i.

11 Q Yeah, I'm not sure the correct pronunciation
12 either, but I'll say "Cui" so we can be consistent.

13 The authors of this paper are Shuguang Cui,
14 Andrea Goldsmith, and Ahmad Bahai; correct?

15 A Yes.

16 Q So Cui was one of Siam's coauthors; right?

17 A Yes. It appears so.

18 Q And the three authors of this paper, Cui, are
19 the authors of the two papers we just looked at that
20 were cited by Siam; correct?

21 A Yes.

22 Q Do you agree that the commonality of authorship
23 and these cross-citations would tend to indicate a
24 POSITA was more likely to consider these references
25 together?

1 MR. BROWAND: Objection to form.

2 THE WITNESS: Petitioner did not make that
3 argument. I'm not providing opinions on that. I don't
4 think Dr. Valenti makes that argument for motivation to
5 combine; so I have not addressed that aspect of it. I
6 do address, just looking at the documents, why a POSITA
7 would not have been motivated to combine all three in
8 the context of disclosing the challenge claims.

9 BY MR. COOK:

10 Q Okay. And you don't have an opinion one way or
11 the other on the commonality of authorship?

12 A Correct. It's a citation. It's not uncommon
13 to look at a citation for a specific disclosure; but I
14 don't think, regardless, a citation here or the reason
15 to combine in the context of disclosing the challenge
16 claims is met.

17 Q Could you turn to page 2806 of the Cui
18 reference. And I'm sorry. I'm going to call it "Cui
19 2003," which I think is what we called it in the
20 petition, if that's all right.

21 A Yes, because there is a Cui 2005. So we're
22 clear, we're referring to Exhibit 1007.

23 Q Do you see figure 1 on page 2806?

24 A Yes.

25 Q And Cui states that -- Cui 2003 states that

1 figure 1 depicts the transmission signal path; is that
2 right?

3 A Are those words -- I see a paraphrasing of that
4 above it. Yes.

5 Q And that signal path includes a chain of
6 circuitry that includes a DAC, a mixer, filters, and a
7 power amplifier; is that right?

8 A It doesn't use that word, "chain of circuitry."
9 I think that you made that up.

10 Q Okay. I don't know if I said chain of
11 circuitry. It includes a signal path that includes a
12 DAC, filters, mixer, and a power amplifier?

13 A That's fair.

14 Q Okay. And you would disagree with calling that
15 a chain of circuitry?

16 A I don't have an opinion on it. You're
17 making -- asking me questions saying it refers to it, of
18 that, and I disagree that those words appear.

19 Q So you're just saying it's not using the word
20 "chain" in the Cui 2003 reference?

21 A Correct.

22 Q Can you look at the bottom of the first column
23 of 2806 where Cui 2003 is describing the transmission
24 period T, it's in about the last sentence or so,
25 column 1.

1 A Yes. I'm there.

2 Q And Cui 2003 is stating that the transmission
3 period is made up of three periods, a transmission
4 period T_{tr} ; an active period, T_{on} ; and a sleep period, T_{sp} ;
5 is that correct?

6 A Yes.

7 Q And the top of that paragraph, that's the last
8 paragraph on 2806, column 1, Cui 2003 explains that a
9 node that has L bits to transmit with the deadline T ,
10 the transceiver will spend time T_{on} communicating the
11 bits; is that right?

12 A Yes.

13 Q So after the system has spent time T_{on} sending
14 these L bits, power consumed during the rest of that
15 period T , is essentially wasted power; is that right?

16 MR. BROWAND: Objection to form.

17 THE WITNESS: I don't see those words.

18 BY MR. COOK:

19 Q T_{on} is time actually sending data. The
20 remainder of the period T , it's not sending any data.

21 Would you agree with that?

22 A Yes, but then it sets it to 0. So if you
23 continue looking at this section, it will actually set
24 P_{sp} to 0 and E_t is just P_t times T_{on} so everything else
25 becomes 0. So essentially this is only disclosing two

1 states, on and off.

2 Q So one Cui 2003 system has finished sending the
3 L bits, it turns off the circuit in the transmission
4 chain to save power until it has more data to send.

5 Do you agree with that?

6 MR. BROWAND: Objection to form.

7 THE WITNESS: I don't see that here.

8 BY MR. COOK:

9 Q What don't you see there?

10 A The description you're saying. Can you point
11 me where you're paraphrasing -- you're reading word for
12 word what's disclosed?

13 Q So if we look at the last paragraph in 2806, it
14 says:

15 "The transceiver time, T_{on} less than or equal
16 to T to communicate these bits, where T_{on} is a parameter
17 to optimize and then returns to the sleep mode where all
18 the circuits in the signal path are shut down for energy
19 saving."

20 Do you see that?

21 A Yes. And that's why it sets the Powersp to 0,
22 and essentially you have what remains in the very last
23 three lines, E_t becomes P_t times T_{on} . So everything else
24 is 0.

25 Q Okay. But before we get to that, let me just

1 ask continuing with where we are on paragraph 28 -- in
2 the last paragraph of column 1 of 2806, the system says
3 "returns to the sleep mode." So that means before it
4 was sending the L bits, it was in sleep mode. Sent L
5 bits and then returned to sleep mode.

6 Would you agree that that's what Cui 2003 is
7 describing here?

8 A It's disclosing two modes. It can be sleep or
9 it can be active.

10 Q Plus a transition mode in between; correct?

11 A Which it sets to 0.

12 Q The transition in between set to 0?

13 A If you look at the last three lines on the
14 second column, it says "where Et" -- which is the
15 transmission -- "becomes Pt and Ton," and then it says
16 the Ttr can be treated as constants defined by the
17 transceiver in use and takes them out of the equation.

18 Q Okay. I think we're talking about different
19 sections here. I'm asking about the bottom of column --
20 of column 1, the paragraph at the bottom of column 1, in
21 2806 where it's talking about the transmit deadline T.

22 Do you see that?

23 A Yes.

24 Q So it spends time Ton communicating the L bits
25 and then it returns to sleep mode.

1 Do you see that?

2 A Yes.

3 Q So when it says "returns to sleep mode," that
4 means it was in sleep mode before it went to Ton,
5 transmitting the L bits.

6 Would you agree with that?

7 A I think you asked me that question before and
8 I've already answered it. And I said yes, it's
9 disclosing only two states. It has an on and an off
10 state.

11 Q Okay. So it's toggling between an on and an
12 off state in order to send L bits at a time.

13 Would you agree with that?

14 A No. It has an off state where it doesn't do
15 anything, and it has an on state where it sends
16 information.

17 Q Okay. And it also has a transition time
18 between the on and the off states.

19 Would you agree?

20 A Yes. We're going around in circles. And then
21 I was describing what this transition time is set to 0
22 in the analysis on the next column. And then you're
23 like no, this is the wrong section; we went back. So
24 we're repeating the same four questions. I was leading
25 you to the result of the analysis, but yes. The

1 transition time and the power for the transition time is
2 considered negligible. And ultimately the final power
3 is just the power on -- is what the result in the second
4 column is describing. So the system that's being
5 modeled is only a system that is on when it transmits,
6 and a system that is off when it's not doing anything.
7 And that's negligible power and doesn't contribute to
8 the total power.

9 Q Maybe you can point out for me where it says
10 that the T transition is set to 0.

11 A The second column. You have E_t is equal to P_t
12 times T_{on} .

13 Q E_t is only the time while it's transmitting;
14 correct?

15 A Yes. And it says everything else is defined as
16 a constant. And because this is where it's defining E_a ,
17 which is the total energy consumption.

18 Q Right. Which still includes T_{tr} , not set to 0;
19 correct?

20 A It's not variable. It's not taken into
21 account. It's a constant. So the only thing that
22 varies is E_t which is P_t times T_{on} . So T_{on} is when it's on
23 and you have an energy; and then the S_p is considered 0.
24 That's a couple lines above it. We set P_{sp} equals to 0.
25 Our analysis can be easily modified where it's not, but

1 it's setting it to 0. And it sets Ptr to be approximated
2 as 2Psyn, and then you end up with the energy is just
3 based on Ton.

4 Q Okay. So once Cui 2003 is finished sending the
5 L bits, it turns off circuits shown in figure 1 in the
6 transmission path in order to save power.

7 Do you agree with that?

8 A I agree it only has two states, an on state and
9 an off state. And when it's in the off state it's not
10 doing anything; and when it's in the on state is when
11 it's transmitting.

12 Q Okay. So Cui 2003 has something that's called
13 a sleep state, not an off state; correct?

14 A Yes. The sleep state is what considers 0 power
15 consumption. So it's like an off state. It assumes
16 it's 0. That's correct.

17 Q So when Cui 2003 system is finished sending the
18 L bits, it turns off the circuits in the transmission
19 path shown in figure 1 in order to save power; is that
20 correct?

21 A I think you've -- you've asked me now this
22 question many times.

23 So the system only has two states. It can be
24 on and it's transmitting; or it can be in the sleep
25 state mode, which considers power to be 0. So it's just

1 **like an off state. Those are the only two states**
2 **described.**

3 Q Okay. And at the top of that paragraph, just
4 under the figures in column 1 of 2806, it says that "The
5 transceiver circuitry works on a multimode basis."

6 Do you see that?

7 A **Yes.**

8 Q It says:

9 "When there's a signal to transmit, all
10 circuits work in active mode."

11 Do you see that?

12 A **Yes.**

13 Q And then, "When there's no signal to transmit,
14 they work in sleep mode."

15 Do you see that?

16 A **Yes. I see those words.**

17 Q Okay. So when the circuits are working in
18 sleep mode, you're saying that they're entirely off?

19 A **I'm not saying entirely off. I'm saying the**
20 **power consumed is set to 0 in the next column for sleep**
21 **mode. That's what I said.**

22 (Simultaneous colloquy.)

23 **THE WITNESS: Sorry. That's -- the reference**
24 **is disclosing sleep mode and approximates it to 0. That**
25 **actually makes it equal to 0.**

1 BY MR. COOK:

2 Q Okay.

3 A Powersp equals to 0. I quote: "Thus, we set
4 Psp = 0."

5 Q Okay. And then just after that sentence you
6 just quoted, it says: "Our analysis can be easily
7 modified to incorporate Psp not equal to 0."

8 Correct?

9 A Yes. They don't do it. They say it. That's
10 correct.

11 Q And if you go to the top of that second column,
12 2806, there's an expression there for the energy
13 required to send L bits that consists of three
14 components.

15 Do you see that?

16 A Yes.

17 Q So the first term is Pon times Ton.
18 So that's the on power multiplied by the
19 on time; correct?

20 A Yes.

21 Q And the second one is Psp times Tsp, which is the
22 sleep power multiplied by the sleep time; correct?

23 A Yes. Which they set equal to 0.

24 Q And then the third term is Ptr times Ttr, which
25 is the transition power times the transition time;

1 correct?

2 **A Correct. Which they consider a constant.**

3 Q And then if you go down further to where you
4 were quoting before. This is near the bottom of 2806.
5 It's the, I guess, second paragraph from the bottom that
6 starts, "In the sleep mode."

7 Do you see that?

8 **A Yes.**

9 Q So it says:

10 "In the sleep mode, the power consumption is
11 dominated by the leaking current, I_l of the switching
12 transistors if the circuitry is properly designed."

13 Do you see that?

14 **A Yes, which they say, "in our analysis, the**
15 **leaking current is approximated as 0" in the very next**
16 **sentence.**

17 Q And that's because they're saying they're using
18 CMOS technology exclusively; correct?

19 **A Yes.**

20 Q And they're saying for CMOS technology, the
21 leaking current is approximately 0 compared with the
22 active mode; right?

23 **A Yes. So essentially, they're describing two**
24 **states of a system. It's on or it's sleep or off, there**
25 **is no current. There's no leakage. There is no power.**

1 **It's assumed to be 0.**

2 Q Well, there is leakage current. It's saying
3 that you can assume for certain technologies that the
4 leakage current will be close to 0.

5 Isn't that what it's saying?

6 A **Yes. And they said the power equals to 0.**

7 Q And also says that the analysis can be modified
8 to incorporate P sleep not equal to 0; right?

9 A **Yes. But they don't do that. They set it**
10 **equal to 0 in their paper.**

11 Q Okay. In sleep mode, the circuits are
12 consuming leakage power; correct?

13 MR. BROWAND: Objection to form.

14 **THE WITNESS: They consume power that is**
15 **considered negligible and equal to 0 as a result of the**
16 **leakage current being approximated as 0.**

17 BY MR. COOK:

18 Q Right. So I just want to make that clear.
19 It's consuming power based on leakage current if you
20 assume that the leakage current is 0, the power
21 consumption in sleep mode will be close to 0; correct?

22 A **Which is what the authors assume in their**
23 **paper. That is correct.**

24 Q Right. But the power consumption itself is
25 power consumed by whatever the leakage current may be?

1 **A Which they assume to be 0. Yes.**

2 **Q Now, the circuits that are turned off in sleep**
3 **mode are the ones that are shown figure 1 of Cui 2003**
4 **that are coupled to the transmit antenna; correct?**

5 **MR. BROWAND: Objection to form.**

6 **THE WITNESS: I don't know if they explicitly**
7 **say that. Can you point me somewhere where you feel**
8 **that's disclosed?**

9 **BY MR. COOK:**

10 **Q So at the bottom of 2806, in that first -- in**
11 **the last paragraph in column 1 of 2806, it says -- it**
12 **refers to a sleep mode where all the circuits in the**
13 **signal path are shut down for energy saving.**

14 **What would you consider to be the circuits in**
15 **the energy path -- sorry, circuits in the signal path**
16 **that are shut down for energy saving?**

17 **A I agree. It's -- they did describe figures 1**
18 **and 2 to be the transmitter side signal path.**

19 **Q So when Cui 2003 transceiver finishes sending a**
20 **block with L bits and turns off the circuits in the**
21 **transmission path to save power, how does that differ**
22 **from what's disclosed in the '120 patent where the**
23 **transceiver that is idle turns off its transmission**
24 **chain to save power?**

25 **A They're very different. The '120 patent is**

1 describing an idle state. An idle state is you're not
2 transmitting, but your power is on. Here, there is no
3 disclosure of an idle state. There is a disclosure of
4 an on state when you're transmitting and there is a
5 disclosure of a sleep state when everything is turned
6 off and you're doing nothing. So there is no disclosure
7 of the idle state, there is no disclosure of idle power
8 consumption in Siam.

9 Q You would agree with me that Claim 25 of the
10 '120 patent never uses the term idle time or idle mode;
11 right?

12 A We can go to the patent. Claim 25 uses the
13 term idle power consumption.

14 Q And does not use the phrase "idle time"; right?

15 A It uses the phrase idle power consumption of
16 the mobile station.

17 Q And Claim 25 does not say idle time anywhere;
18 right?

19 A I don't see those words. I don't know where
20 you came up with those words.

21 Q And it doesn't use the phrase idle mode, does
22 it?

23 A I mean, we can spend all the day telling what a
24 phrase -- what a claim doesn't say. You don't need me
25 as an expert to tell you what the claim says or not.

1 You can read the claim, and which -- see what it
2 discloses or doesn't disclose. You don't need an expert
3 opinion for that.

4 Q Okay. But I'm just asking you, it doesn't
5 disclose the phrase "idle mode;" right?

6 A It discloses idle power consumption. I don't
7 see "idle mode." Idle time is disclosed in the
8 specification, but not in the claims.

9 Q So going back to Cui 2003, when the transceiver
10 works on a multimode basis, it states that when there's
11 no signal to transmit, the circuits all work in sleep
12 mode; correct?

13 A The circuits are shut off in sleep mode. When
14 there's nothing to transmit.

15 Q And the Cui 2003 describes that mode as a mode
16 in which the circuits are working; right?

17 MR. BROWAND: Objection to form.

18 THE WITNESS: Not exactly. Going back to what
19 it does state, it says the transceiver circuits work on
20 a multimode basis. There's a signal to transmit all
21 circuits work in active mode. When there's no signal to
22 transmit, they work in sleep mode. And they switch to
23 sleep mode, you know, back and forth between active mode
24 and sleep mode. So they can be on, transmitting; or
25 they can be in sleep mode, not transmitting.

1 BY MR. COOK:

2 Q And when they're in sleep mode, not
3 transmitting, they're working according to Cui 2003;
4 correct?

5 MR. BROWAND: Objection to form.

6 THE WITNESS: No. I don't know what you mean
7 by "working." They're not doing anything.

8 BY MR. COOK:

9 Q I'm just quoting from Cui 2003, where it says
10 when there's no signal to transmit, they work in sleep
11 mode.

12 MR. BROWAND: Objection to form.

13 THE WITNESS: I agree that you're reading those
14 words, but when you're changing the question of what are
15 they doing. They're not transmitting.

16 BY MR. COOK:

17 Q I agree they're not transmitting. But they're
18 working in sleep mode; correct?

19 MR. BROWAND: Same objection, Counsel.

20 THE WITNESS: I agree that you read those words
21 correctly.

22 BY MR. COOK:

23 Q Do you agree a POSITA would understand that
24 something that's entirely powered down and not operating
25 would not be working?

1 MR. BROWAND: Objection to form.

2 THE WITNESS: Your generalization is too broad,
3 so I don't have an opinion on that. But I do have an
4 opinion that a POSITA reading this reference understands
5 when it says there is no signal to transmit in sleep
6 mode, they're doing -- they're not transmitting in sleep
7 mode. And that's really what's relevant to the analysis
8 as far as does it disclose the challenge claim.

9 BY MR. COOK:

10 Q So isn't -- aren't circuits that are working in
11 sleep mode waiting to transmit?

12 A No. There is no evidence that this is what's
13 being disclosed or taught by this reference. This is
14 complete, 100 percent hindsight bias that is completely
15 unsubstantiated by this reference. The term "waiting"
16 nowhere appears in this reference. There is no waiting
17 to transmit in this reference. You're either
18 transmitting or you're not transmitting.

19 MR. COOK: Okay. Let's move on to Exhibit 11.

20 (Exhibit 11 was marked.)

21 THE WITNESS: Okay. I have it open.

22 BY MR. COOK:

23 Q Do you recognize this exhibit?

24 A I do.

25 Q And what is this exhibit?

1 A So this is Exhibit 1008. I'm assuming you mean
2 tab 11, Exhibit 1008, which is entitled "Performance Of
3 a UMTS Uplink MIMO Scheme" that we refer to as the
4 Tiirola, spelled T-i-i-r-o-l-a, reference.

5 Q Okay. Can you look at the last sentence of the
6 abstract.

7 It says:

8 "Based on this study, the MIMO concept does not
9 seem feasible for improving UMTS uplink performance."

10 Do you see that?

11 A I do.

12 Q And can we turn back to your declaration,
13 paragraph 118.

14 A I'm there.

15 Q So at paragraph 118, you rely on that statement
16 to conclude that Tiirola is expressly disparaging MIMO;
17 is that correct?

18 A Yes.

19 Q Let's go back a few sentences in Tiirola's
20 abstract.

21 A I'm there.

22 Q This is the one that starts out "For example,
23 in terms of isolated self-capacity."

24 Do you see that one?

25 A Yes.

1 Q Tirola says there that:

2 "MIMO technique with two transmit and two
3 receive antennas performed at approximately 50 percent
4 worse than a traditional approach with one TX and four
5 RX antennas."

6 Do you see that statement?

7 A Yes.

8 Q So Tirola is studying the trait being doubling
9 the number of receive antennas versus adding a second
10 antenna at the mobile device.

11 Do you agree with that?

12 A I agree they are doing that comparison in the
13 sentence that you read, but I wouldn't generalize.

14 Q That's where Tirola concludes that MIMO will
15 not offer an improvement; correct?

16 A Not exactly. "Not offer an improvement" is the
17 last sentence of their abstract.

18 Q And the sentence right before that says:

19 "However, doubling the number of receive
20 antennas is still more efficient than introducing a
21 second transmit antenna at the UE"; correct?

22 A Yes.

23 Q If we look at the sentence just before that, it
24 says:

25 "Results also show that MIMO transmission will

1 provide some benefit (up to 2dB) for UL coverage and UE
2 battery consumption"; correct?

3 A I do see those words. Yes.

4 Q And "UE" stands for "user equipment" like a
5 mobile phone; right?

6 A Yes.

7 Q And if we look at the conclusion section that's
8 on page 660 of Tirola.

9 A I'm there.

10 Q In that conclusion paragraph, Tirola also
11 repeats that:

12 "MIMO transmission will provide gain up to 2dB
13 for UL coverage and UE battery consumption."

14 Do you see that?

15 A I see that sentence, yes.

16 Q So a POSITA interested in battery consumption
17 at the mobile device would understand Tirola to be
18 suggesting that MIMO could provide some benefit in
19 certain situations; correct?

20 MR. BROWAND: Objection to form.

21 THE WITNESS: No. That statement based on the
22 results that they're showing is for that 2dB that you
23 have a gain is only shown in an ideal scenario which is
24 when you look at their four figures that Petitioner
25 cited, figure 4 is in the top right figure of figure 4;

1 and what's important is that the end of each figure,
2 figure 4 has four, and the top two say one-path
3 Rayleigh, R-a-y-l-e-i-g-h, a one-path Rayleigh. And it
4 says 50 kilometers per hour. So you have a car going
5 30 miles an hour with a one-path Rayleigh. A one-path
6 Rayleigh is a control simulation environment that is
7 completely ideal. You have a single path between a
8 transmitter and a receiver. This is the absolute best
9 you can do in a vacuum where there is no multipath, no
10 reflection, no -- of any signals. The bottom two
11 figures where they're using the ITU model is worse. So
12 according to them, the only benefit is in a theoretical
13 vacuum using a one-path Rayleigh.

14 So a POSITA reading that conclusion but looking
15 at the figures would understand that the reference
16 itself is teaching the way. Because only the one-path
17 Rayleigh, which is a hypothetical ideal, which isn't
18 even -- consists of a two-ray model, which normally what
19 we do is where you have one line of sight and one
20 reflected, they're only using a one-path Rayleigh, which
21 is ideal where they get that benefit. Everything else
22 is worse.

23 So the opinion that I gave is consistent with
24 how a POSITA reading the entire paper and the simulation
25 understands it, even with the one sentence that you're

1 pointing out that is referring to an ideal situation
2 that cannot be realized in real situations.

3 BY MR. COOK:

4 Q Okay. So we'll discuss figure 4 a little more
5 but just looking at the conclusion, what I was talking
6 about there was for uplink coverage and UE battery
7 consumption. Figure 4 is relating to number of users.

8 So as far as UE battery consumption goes, MIMO
9 transmission can provide some gain. That's what the
10 conclusion says; correct?

11 A I agree that you read the words correctly, but
12 I believe you're taking them out of context based on the
13 whole paper.

14 Q Let's go to figure 4 that you were talking
15 about earlier.

16 So these figures are labeled UL noise rise,
17 SIMO and MIMO; correct?

18 A Yes.

19 Q And what do you understand these figures to be
20 showing?

21 A So the figures are the y-axis is the noise
22 rate. So as you go up from the bottom to up vertically,
23 the worse it's performing, the x-axis is the number of
24 users using a rate of 64 kilobits per second. And so as
25 you move left to right, you have more users in the

1 system. And it's -- all cases, it's comparing 1 by 2, 2
2 by 2, 1 by 4, and 2 by 4. And then we can go into the
3 results.

4 Q So in each of these figures, the upper pair of
5 curves is comparing the noise rise between a 1-by-2 SIMO
6 system and a 2-by-2 MIMO system; correct?

7 A Yes. The top row is for -- the top left is
8 you're walking. The top right is you're driving slow,
9 around 30 miles an hour; it's 50 kilometers per hour.
10 And you have a one-path Rayleigh. So it's a fairly
11 ideal situation. That's kind of like your control, the
12 absolute best that you can do in an ideal situation; and
13 then the bottom row is you're using the ITU model which
14 is a more realistic model; but you're also doing a
15 simulation for walking on the left and driving slow
16 around 30 miles on the right.

17 Q And within each of the four figures, there's
18 two pairs of curves. And the upper pair of curves in
19 each graph is comparing the noise rises between a 1 by 2
20 SIMO system and a 2 by 2 MIMO system; is that right?

21 A Yes. And that is correct. Where the top --
22 the left bar, they're both the same. Like, there is no
23 improvement between the two.

24 Q And then the lower pair of curves in each of
25 those four graphs is comparing the noise rise between a

1 1 by 4 SIMO testimony and a 2 by 4 MIMO system; is that
2 right?

3 A Yes.

4 Q So in case B, that's the upper right case, that
5 shows that the 1 by 2 SIMO system noise increases faster
6 than the 2 by 2 MIMO system noise as a function of the
7 number of users; is that right?

8 MR. BROWAND: Objection to form.

9 THE WITNESS: In this ideal, one-path Rayleigh
10 driving 30 miles an hour, that is correct.

11 BY MR. COOK:

12 Q And in graphs C and D, the MIMO system noise
13 generally seems to increase faster than the SIMO noise
14 as a function of the number of users.

15 Is that true?

16 A Yes. And the more realistic model where you're
17 using the ITU model, that is correct.

18 Q Now, if you increase the noise in a
19 communications channel you have to increase the signal
20 power to maintain the same signal-to-noise ratio; is
21 that right?

22 MR. BROWAND: Objection to form.

23 THE WITNESS: I don't have an opinion on that.
24 That is usually the case with all -- everything else
25 being kept the same, but again, it's an incomplete

1 hypothetical.

2 BY MR. COOK:

3 Q What is the significance of the noise rise in
4 these curves in figure 4?

5 A I don't understand the question.

6 Q Why would a user care about the increase in
7 noise between the SIMO and MIMO modes as a function of
8 users?

9 A The paper, if you go to page 658 which is the
10 second page, on the left column it states that, "Noise
11 rise is used as a final performance criterion for
12 different transmission schemes. It is calculated from
13 an upload load factor." And this is, like, between
14 equations 2 and 3. So that's what the paper is
15 describing that term.

16 Q So an increased noise means that you're going
17 to have to have increased signal energy to achieve the
18 bit energy?

19 A Not necessarily. It just means you have more
20 noise. So if you want the same performance you need to
21 compensate for it some other way. Power is one way.
22 There's other ways. You can do better coding. You can
23 do better error correction. You can -- so there's
24 multiple ways to compensate for noise. They're just
25 looking at the noise rise. But it doesn't automatically

1 mean that you need more power. There's different ways
2 to compensate for noise.

3 Q Raising a signal power is one way to compensate
4 for increased noise in the channel; is that right?

5 A It is one way, yes. There's many ways a POSITA
6 would -- would think of. It is one way.

7 Q So if the noise power for the SIMO case is
8 different from the noise power for the MIMO case, that
9 could change the relative energy optimized rates for
10 SIMO and MIMO cases, couldn't it?

11 MR. BROWAND: Objection to form.

12 THE WITNESS: That's not disclosed here.
13 That's hindsight analysis that Petitioner is assuming.
14 Hindsight bias. That's not -- a POSITA would not --
15 reading this paper would not necessarily come to that
16 conclusion.

17 BY MR. COOK:

18 Q Okay. But that is the case, though; correct?

19 A No, I disagree. That's hindsight bias.

20 Q If you calculate energy optimized rate for MIMO
21 and you have an increase in the noise for MIMO, that
22 could change your calculation of the energy optimized
23 rate for MIMO, wouldn't it?

24 A I'm not sure. I disagree that that's being
25 disclosed here.

1 Q Okay. Well, if you calculated energy optimized
2 rate for MIMO and another energy optimized rate for
3 SIMO, assuming that they have the same noise power in
4 the channel, and then you changed the noise power for
5 one of those channels, the SIMO mode, wouldn't that
6 change the energy optimized rate for the SIMO case?

7 MR. BROWAND: Objection.

8 THE WITNESS: Not necessarily. There's other
9 factors you're not taking into account.

10 BY MR. COOK:

11 Q Like, what other factors?

12 A The encoding. The way you do error correction.
13 So there's multiple other things that can affect and
14 compensate for it. So there isn't -- your assumption is
15 an incomplete hypothetical based on hindsight bias of
16 looking at the '120 patent and the invention there and
17 then trying to map that to these two papers to come to
18 that conclusion.

19 Q Well, the Siam reference, for example, is
20 calculating an optimized transmission mode based on
21 optimizing the energy per bit, isn't it?

22 A The Siam paper, we discussed what it's doing,
23 but that's not what's being disclosed in this reference
24 in the -- in Exhibit 1008, which is what you're asking
25 about.

1 Q So one way of compensating for a change in the
2 energy optimized rate in SIMO mode due to noise is to
3 increase the amount of signal energy that you use for
4 that mode; correct?

5 A That is one way, and that's usually the worst
6 way because you increase power -- you drain -- you use
7 more power, things die faster, and you cause more
8 interference. So it is one way, but it's usually the --
9 the last resort.

10 Q So an increase in the noise of the SIMO channel
11 might be a reason not to select SIMO; to select MIMO
12 instead; correct?

13 MR. BROWAND: Objection to form.

14 **THE WITNESS: What is the question again?**

15 BY MR. COOK:

16 Q I said, an increase in the noise at the SIMO
17 channel might be a reason not to select SIMO; to select
18 MIMO instead?

19 Do you agree with that?

20 MR. BROWAND: Same objection.

21 **THE WITNESS: Based on what? You're asking an**
22 **incomplete hypothetical. Like, I don't understand the**
23 **context that you're framing your question.**

24 BY MR. COOK:

25 Q If the noise in the SIMO channel increases, for

1 example, based on the number of users, that might make
2 SIMO look a little bit less desirable than MIMO in some
3 situations; correct?

4 MR. BROWAND: Object to form.

5 THE WITNESS: I don't see that conclusion based
6 on what's disclosed in this reference.

7 BY MR. COOK:

8 Q You'd agree Tirola generally discloses that
9 there's a difference in the noise increase between SIMO
10 and MIMO mode as a function of number of users?

11 MR. BROWAND: Objection to form.

12 THE WITNESS: That is not the -- what's being
13 taught or disclosed in this paper. It is doing a
14 comparison between a 1 by 2, 2 by 2, 1 by 4, 2 by 4, for
15 an ideal model, one-path Rayleigh, and a more realistic
16 ITU model of walking and driving slow. That's at least
17 what figure 4 that we've been looking at and what
18 Petitioner points to.

19 BY MR. COOK:

20 Q Can you go to paragraph 120 of your
21 declaration.

22 A Yes. I'm there.

23 Q In the middle of that paragraph, I think
24 there's some language that's bolded there where you say:
25 "Dr. Valenti concedes that based on eight

1 examples in the figure 4, five examples show the noise
2 rise for MIMO was larger; two show the noise rise is
3 about the same for MIMO and SIMO; and only one showed
4 the noise rise for SIMO mode was larger."

5 Do you see that?

6 A Yes.

7 Q Do you agree that's what Tirola shows?

8 A Those are what's disclosed by the simulation in
9 figure 4, yes.

10 MR. COOK: Okay. I think I'm getting close to
11 done. If we could take, like, just a five-minute break,
12 I can look over my notes.

13 THE WITNESS: Perfect.

14 MR. BROWAND: Go off the record.

15 (Recess.)

16 MR. COOK: Thank you, Dr. Akl. I have no more
17 questions at this time.

18 MR. BROWAND: And I have no questions for
19 Dr. Akl. We will review and sign.

20 THE COURT REPORTER: Okay. Anything else? Do
21 you need rough drafts?

22 MR. BROWAND: Yes. Go ahead, Brian.

23 MR. COOK: Yes, yes. Please, we'd like a rough
24 draft. Can we expedite the transcript final for next
25 Monday? Would that be doable?

1 THE COURT REPORTER: Sure.

2 MR. BROWAND: And Cheryl, we'd like a rough
3 draft, if you could e-mail it. Is that today or
4 tomorrow? Just so we know.

5 THE COURT REPORTER: It's today.

6 MR. BROWAND: That would be great. And then
7 we'll take regular delivery on the final transcript.

8 (Time noted: 1:16 p.m. PT/3:16 p.m. CT)

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1 DECLARATION UNDER PENALTY OF PERJURY

2

3 I, Robert Akl, Ph.D., do hereby certify under
4 penalty of perjury that I have read the foregoing
5 transcript of my deposition taken on Wednesday,
6 May 28, 2025; that I have made such corrections as
7 appear noted herein; that my testimony as contained
8 herein, as corrected, is true and correct.

9

10

11 DATED this _____ day of _____ ,
12 2025, at _____ , _____
13 City State

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Robert Akl, Ph.D.

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1	ERRATA SHEET		
2	Printed Name _____		Date _____
3	Signature _____		
4	Page/Line	Correction	Reason
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1 REPORTER'S CERTIFICATE

2 I, CHERYL HAAB SCOTT, CA CSR # 13600 DO HEREBY
3 CERTIFY THAT THE FOREGOING DEPOSITION OF ROBERT AKL, PH.D.,
4 WAS TAKEN ON MAY 28, 2025 VIA ZOOM VIDEOCONFERENCE BEFORE ME
5 AT 08:05 A.M. FOR THE PURPOSE IN THE CAPTION STATED; THAT
6 THE WITNESS WAS FIRST DULY SWORN TO TELL THE TRUTH, THE WHOLE
7 TRUTH, AND NOTHING BUT THE TRUTH; THAT THE DEPOSITION WAS
8 TAKEN BEFORE ME STENOGRAPHICALLY AND AFTERWARDS
9 TRANSCRIBED UNDER MY DIRECTION; THAT THE FOREGOING IS A
10 FULL, TRUE, AND CORRECT TRANSCRIPT OF THE SAID DEPOSITION
11 SO GIVEN; THAT COUNSEL FOR ALL PARTIES WERE PRESENT AT
12 THE TIME OF THE DEPOSITION; THAT THERE WAS A REQUEST THAT
13 THE WITNESS READ AND SIGN THE TRANSCRIPT.

14 I FURTHER CERTIFY THAT I AM NEITHER OF COUNSEL NOR
15 OF KIN TO ANY OF THE PARTIES TO THIS ACTION, AND AM IN
16 NO WAY INTERESTED IN THE OUTCOME OF SAID ACTION.

17

18

19 WITNESS MY SIGNATURE ON JUNE 2, 2025.

20

21

22

23

24

25



Cheryl Haab Scott, RDR, CRR, CCRR
CSR No. 13600/WA CSR No. 3499/NV CCR No. 1003

Exhibits	\$			
Exhibit 1 5:3 10:1,2,5, 8,24 11:10	\$995 16:22,25	119:2,20 122:5,19 123:4 127:3, 11,17 137:1, 2,19 138:1,5 143:14	31:9,25 32:9 40:11 52:13 60:13,24 62:2,12 63:17 71:2 97:7,8 102:6 105:2 127:22,25 128:10 141:16 143:20	107:20 108:5 19 71:3 95:11, 12,13,17,23 96:12,13 97:2 1:16 145:8
Exhibit 2 5:5 15:21,22, 25 16:2,3,7 31:21	- --ooo-- 6:4,14,20 74:5,7	1-by-2 137:5 10 50:19 52:13 56:19 113:22, 23	13 71:12 13600 6:8 14 71:22 99:4 15 32:10 34:8 37:14,15 71:22 150 97:7,9 16 81:8 89:23 90:1,7 160 97:6 17 89:23 90:1,7 175 8:15 18 94:18 95:20, 24 96:11,15, 21 97:21,25 98:2,3,10 100:9 101:3, 15,18,19 105:13	2 15:21,22,25 16:2,3,7 30:14 31:21 32:7 50:18 52:13 56:19 98:19 106:2, 4,8 127:18 137:1,2,19,20 138:1,5,6 139:14 143:14 2-by-2 137:6 20 17:4,5,11,12 94:22 106:6, 11 200 106:4,8,10, 12,14,18,21, 24 2003 115:19,25 116:20,23 117:2,8 118:2 119:6 122:4, 12,17 127:3, 19 129:9,15 130:3,9
Exhibit 3 5:7 19:12,13, 16,18,19	0	100 61:17 131:14 1005 93:25 94:8 1006 102:15,17,21 1007 114:5 115:22 1008 132:1,2 141:24 11 24:17 26:15 29:24 37:17 131:19,20 132:2 118 132:13,15 12 30:15 71:13 87:17,21 120 10:17 14:13, 19,22 18:5,14 19:1,2,5,21, 24 20:6 29:20 30:14,17,18		
Exhibit 4 5:9 43:14,15 59:24,25 60:3,5 77:16	0 46:16,17 49:16 50:6, 11,12 51:12 52:4,5 53:17 117:22,24,25 118:21,24 119:11,12 120:21 121:10,18,23, 24 122:1,14, 16,25 123:20, 24,25 124:3, 4,7,23 125:15,21 126:1,4,6,8, 10,15,16,20, 21 127:1			
Exhibit 5 5:11 44:16,18 81:13,14,16, 18,21 94:2				
Exhibit 6 5:12 81:7 87:9,11,13				
Exhibit 7 5:13 90:13, 14,17,19				
Exhibit 8 5:15 93:13, 14,15,17,19, 23,24 94:2				
Exhibit 9 5:18 102:9, 10,13,15	1 10:1,2,5,8,24 11:10 33:8, 18,22 81:21 98:16,20 106:13 115:23 116:1, 25 117:8			
Exhibit 10 5:20 113:22, 23				
Exhibit 11 5:23 131:19, 20				

2005 115:21	31:21	20:6,8,13	450 20:21,24 21:3	477 23:21,22
2006/0067263 93:20	28 6:1 119:1	22:22,24	23:13,15	48 35:5 40:22
2024-00896 10:12	2806 115:17,23	23:9,25	28:25 29:5,8	41:8
2025 6:1	116:23 117:8	24:12,24	452 20:21,24 21:3	
21 106:16	118:13 119:2,	25:2,9 26:6	23:13	5
210 106:22	21 123:4	27:4 28:19	454 22:21,24	5 44:16,18
211 107:11	124:12 125:4	29:7,11,13,24	23:4,6,15	81:13,14,16,
220 106:24	127:10,11	30:12 32:7	25:23,25 26:4	18,21 94:2
230 107:15	2db 134:1,12,22	34:7 35:6	28:20,24	113:19
24 90:20 107:2,	2psyn 122:2	43:14,15	29:10,19	50 40:4,6 49:24
240A 106:15,17		53:22 55:7	30:1,6 53:22	50:17 133:3
240B 106:15,17	3	59:24,25	76:10	135:4 137:9
25 33:15 60:8,11	3 19:12,13,16,	60:3,5 71:3	455 26:7,21 28:19	52 65:2 67:12
70:24 71:1,6	18,19 27:2	76:9 77:4,16	456 26:7 28:19	56 68:14 80:2
77:16 78:2,5	32:10 33:15,	113:16	457 26:7 28:19	
81:10 128:9,	21 34:7,8,19	134:25 135:2	458 26:8	6
12,17	35:6,17 50:18	136:4,7,14	459 24:13 26:8	6 27:2 71:4
250A 106:19	52:13 56:18	137:2 138:1	46 35:5	81:7 87:9,11,
250B 106:19	64:20 71:2	139:4 143:14,	460 22:21,25 23:6	13 113:14
26 60:12	139:14	17 144:1,9	24:21 29:15,	60 94:14,17,21
27	30 135:5 137:9,	40 34:18 35:17	22 76:10	101:5 108:6
	16 138:10	38:5	465 24:19,22	61 95:16 96:24
	3030 7:2	405 20:8	47 35:5 42:14	98:15
	33 38:19	41 35:18	43:20,21	64 103:2,4,11,16
	35 34:18 35:17	410 20:14,16	470 26:3 29:5,8	136:24
	38:4	21:2,6,9 24:3		658 139:9
		26:10 29:13		
	4	415 20:14		
		420 20:14		
	4	422 20:10,11		
	4	45 13:9 35:18		
		44:25		

660 134:8	94 110:24 111:1	125:22 129:21,23	23 80:17	136:11 142:19 143:8 144:7
7	A	actively 40:25 41:3,22 52:7,17 54:12,18 55:1 58:11,15 65:22 66:2,3 68:7	adjusting 103:6,25	agreed 6:13
7 90:13,14,17, 19	A.J. 113:17		adopt 89:8,14,15 90:3	agrees 88:2
70 16:7,9	A.M. 6:2		adopted 89:24	ahead 109:13 144:22
75 109:8,18,20	absolute 135:8 137:12	activity 52:17,20 54:14	affect 39:11 64:9 70:6 72:17 141:13	Ahmad 114:14
75204 7:2	abstract 112:5 132:6, 20 133:17	actual 94:23	affiliated 67:7 101:13	Akl 6:16,23,25 74:9 144:16, 19
8	academic 111:3,16	Adaptive 102:18	afternoon 13:18	America 11:1,7
8 34:7 90:25 93:13,14,15, 17,19,24 94:2,3	access 7:10 98:20,23 102:1 106:12, 21 112:12	added 31:15 36:3 75:9	agnostic 79:9	amount 17:16 33:16 36:20 50:11 142:3
8,789,120 10:19	accessible 8:2	adding 34:11 75:6 92:21 133:9	agree 18:1,2 26:20 32:4 36:16 43:25 44:5 45:15 60:24 66:18 77:24 78:21 82:2,4 84:25 85:3, 10,25 86:3,7 87:6 88:5,13, 18 89:8 90:6 91:20 98:6 99:23,25 100:12,16,20 108:8 112:16, 20 114:22 117:21 118:5 119:6 120:6, 13,19 122:7,8 127:17 128:9 130:13,17,20, 23 133:11,12	amplifier 24:12,13,15, 19,22,23 25:3,5 36:11, 19 55:5,9,19 96:5 103:14 116:7,12
8,798,120 10:15,22 19:19	accommodati ons 110:9	additional 17:20 64:23		analog-to- digital 96:6
83 104:4,7	accordance 99:19	address 7:1,5 47:7 61:15 98:9 105:22 108:19,25 115:6		analogy 40:23 41:7,24
88 99:8	account 64:18 80:16, 20 86:5 121:21 141:9	addressed 115:5		analysis 16:21 18:3,24 86:19 98:18 120:22,25 121:25 124:6
8:05 6:2	accurate 85:7,15	addressing 97:13,15,18 105:10		
9	achieve 139:17	adds 91:5 92:9		
9 102:9,10,13, 15	active 52:24 117:4 119:9 123:10	adjectives 74:23 75:13,		

125:14 126:7 131:7 140:13	applications 7:9,23,24	articulated 27:15,20	authors 109:22 110:2 113:20 114:13,18,19 126:22	base 19:25 20:8 99:10 101:12
analyzed 37:2 55:11	applies 90:7 101:16	articulating 28:2		based 25:20 30:24 31:6,10,17 32:1 34:1 35:5 79:24 91:6 99:20 100:24 107:22 108:1, 14 122:3 126:19 132:8 134:21 136:12 141:15,20 142:21 143:1, 5,25
Andrea 114:14	apply 68:4 101:18	aspect 115:5	authorship 114:22 115:11	
answers 9:10,14	applying 111:25	asserted 14:13	automatically 139:25	
antenna 21:10,16 22:16 23:12, 15,17,18 26:4 28:25 29:5,8 70:18,19 71:4,5,14 72:3,23 127:4 133:10,21	approach 133:4	assume 110:7 111:8 126:3,20,22 127:1	Avenue 7:2	
	approximated 122:1 125:15 126:16	assumed 126:1	avoid 104:13	
	approximatel y 94:21 101:5 108:6 125:21 133:3	assumes 30:6 122:15	B	
antennas 20:21,24 21:3,15 22:4, 6,10 35:4,14 71:16,23,25 96:7 112:13, 18,22 133:3, 5,9,20	approximates 123:24	assuming 132:1 140:13 141:3	B-A-S-I-C 103:10	basically 34:9 79:10 80:11
AP110 97:5 98:20,22	argmin 32:19	assumption 31:15 141:14	back 32:8 34:6 39:23 40:22 43:18 49:3,24 53:6 63:14 71:12 73:12 76:9 77:15 80:21 94:13 96:22 101:2 103:1 106:1 120:23 129:9, 18,23 132:12, 19	basis 33:11 55:12 104:1 123:5 129:10,20
apparatus 110:2	argument 91:18 104:5 105:16,17 115:3,4	attend 15:8		battery 94:21,23 101:6 108:6 134:2,13,16 136:6,8
appears 24:4 27:1 30:9 32:13 37:13 66:10 68:10,12 76:16 98:13 100:12 114:17 131:16	arrow 23:12	attorney 91:21		behalf 13:22
	arrowhead 23:14	attorneys 16:17 91:17	background 19:23	benefit 134:1,18 135:12,21
	art 12:18,21 19:6 64:11 94:12 104:25 110:7, 9	attribute 57:13	Bahai 113:17 114:14	bias 104:13 105:1, 17 110:20 111:19 131:14 140:14,19
applicability 113:2	article 102:18 109:21	attributed 51:10,11	bar 137:22	
		audible 9:14		
		author 113:11		
		author's 102:20		

141:15	bottom	24:6 25:12	bullet	capital
bit	87:21 116:22	26:12 27:13,	49:25 51:4	103:9,10
22:5 32:2	119:19,20	19 28:12 29:1	52:23 53:13	caps
38:11 39:2,11	125:4,5	30:3 31:13	54:9,23	103:9
46:15 49:15,	127:10	33:20 35:23	57:10,23	car
20 50:10	135:10	36:5 37:4	but	40:23,24
63:16 74:25	136:22	38:14 39:16	92:10	41:4,5,9,10,
139:18	137:13	40:15 41:14		16,17,19,21
141:21 143:2	Box	44:15 46:11	C	42:1,7,8,10
bits	26:21	47:4,16 48:4		135:4
40:17 117:9,	brake	49:11 51:20	C-U-I	care
11,14 118:3,	41:10 42:2	52:21 53:5,23	113:12	139:6
16 119:4,5,24	brakes	54:6,22 56:2	114:10	carefully
120:5,12	41:17	57:3 58:2,22	calculate	85:9
122:5,18	break	59:10 62:4	37:11,16	carrier
124:13	37:23 38:1	64:4 67:5	140:20	96:1
127:20	39:22,24	69:6,15 70:4	calculated	case
block	74:3,4	72:8,20 74:2,	139:12 141:1	17:14 34:21
25:22 26:4	109:12,14,17	15 75:4 76:23	calculating	35:4 40:11
29:10,14,19,	144:11	78:22 83:7,24	30:23 31:1,3	42:1 50:5,8
22 34:18	breaks	88:14,21	141:20	51:11 52:4,16
53:22 98:20	8:10 74:9	89:19 92:4	calculation	56:25 57:1
127:20	Brian	93:1 95:3,22	140:22	70:13 105:3
blocks	144:22	97:14,23	California	138:4,24
26:20 98:24	broad	100:19	6:6	140:7,8,18
board	18:21 22:12	103:23 108:9,	call	141:6
45:9 61:12	39:14 65:18	20 109:2	11:23 12:2	cases
63:16,17	131:2	113:4 115:1	33:2 94:2	56:24 137:1
79:8,10	broadcast	117:16 118:6	115:18	140:10
board's	21:22,25	126:13 127:5	called	caution
42:16 45:2	brought	129:17 130:5,	6:17 29:22	11:20 13:2
77:18,20,24	94:12	12,19 131:1	33:13 103:6	14:4
78:10,20	Browand	134:20 138:8,	115:19	cellular
79:2,5,25	6:13 11:20	22 140:11	122:12	99:2,5
87:4	12:5 13:2	141:7 142:13,	calling	Certified
body	14:4,23 18:7,	20 143:4,11	26:19 94:1	6:6
bolded	15 20:2	144:14,18,22	114:8 116:14	chain
143:24	21:11,17	145:2,6	capable	23:8,25 24:5,
	22:17 23:2	bucket	76:21 112:12	24 25:10,18,
		46:17		
		build		
		110:2		

22 26:19,21, 25 27:3,7,10, 12,18,24 28:4,6,9,10, 22 30:2,7,8, 11 49:9 54:20 55:1 58:10 64:2 65:18 66:7,13 67:3, 7,13,18 68:2, 11 74:14 75:2,6,17,19, 22 76:1,13 77:2,8 116:5, 8,10,15,20 118:4 127:24	141:4 changing 130:14 channel 20:10,11 38:12 39:3,6, 11 50:22 51:6 56:21 100:4 112:12 138:19 140:4 141:4 142:10, 17,25 channels 141:5 characterizati on 25:14,20 34:14 108:11 check 78:4 Cheryl 6:6 145:2 circles 76:9 120:20 circuit 26:7 35:11, 13,22 36:4 58:25 59:1,2 103:18,21 118:3 circuitries 22:19 circuitry 22:9,19,20 23:24 24:4,21 25:25 26:1,8, 14,20 28:15, 16,17,21,22, 24 29:10,18,	20,22,25 30:10 35:4 43:23 44:12, 21 48:2,8,10, 17,22,25 49:2,4,5,8,23 52:1,9 53:2,7, 10,21,25 54:13,14,15, 24 55:5,8,14, 15,16 56:10, 12,13 57:10, 20 58:12,19 59:7,12,13, 14,17,22,23 60:14,16 61:1 62:2,9,13,24, 25 63:5,6,8,9, 10,11,20,21 64:1,21,22 66:4,20,23 67:3,4,6,8,24, 25 68:5,13, 18,22 69:3, 10,13 70:3,7, 8,12,14,17, 18,25 71:3,5, 9,11,15,18 72:1,2,6,12, 16,18,23 73:5,16,20 74:14 75:2,6, 7,9,10,17,18, 22 76:2,5,6,7, 11,12 77:13 80:25 81:3,6, 25 82:11,23 83:4,14,15,22 84:5,24 85:2, 14 88:11,19 89:16 90:9 91:10 103:14 116:6,8,11,15 123:5 125:12	circuits 28:11,17 54:17 118:18 122:5,18 123:10,17 126:11 127:2, 12,14,15,20 129:11,13,16, 19,21 131:10 citation 115:12,13,14 cited 12:17,19 96:4,8 113:8 114:20 134:25 cites 97:3 113:19 citing 97:2,3 claim 13:1,5 14:21 15:2,5,6,8,12, 14,15 27:22 43:16 44:3,7 49:3,6,14 53:6 56:4,8, 11 59:1,19,21 62:15,19 63:22 64:8,9, 15 67:22,23, 24 69:23 70:24 71:1,6, 24 72:22 73:8,12,23,24 74:1 79:25 80:4,18 81:5, 10 82:12,15 84:15,17 85:5,8 87:5, 14 89:7,10,	14,22 92:11 100:3,5,12 107:23 128:9, 12,17,24,25 129:1 131:8 claimed 63:4,8 claims 48:9,14,15,16 53:25 55:13 56:7,9 58:25 59:3,11 62:20,22,23 63:4,13,18, 20,24 64:8, 10,17,20 68:13 70:8,20 71:13 86:4 88:4 100:25 108:2 115:8, 16 129:8 clarification 23:20 62:5 65:24 70:22 93:8 112:6 clean 9:2,3 clear 47:20 62:23 63:15 64:21 84:11 115:22 126:18 close 46:16 126:4, 21 144:10 CMOS 125:18,20 coauthors 113:3 114:16
--	--	---	---	--

coding 139:22	combined 105:20 111:2	compensatin g 142:1	141:18 143:5	29:23 42:4,6
collaboration 16:16	common 34:4	complete 131:14	conclusions 110:6 111:7	44:2,6,9,13
collaborative 16:18	commonality 114:22	completely 131:14 135:7	condition 79:11,18	45:12 58:16
collision 96:1	communicate 118:16	component- by- component 55:12	conditions 39:5 68:24	61:2,3,4
colloquy 123:22	communicati ng 94:23 117:10	components 26:3 48:12	69:2 79:11	66:21 68:8
column 24:17 26:15	119:24	55:15 56:3,13	82:17	80:4,10,24
27:2 29:24	communicati on 7:24 8:2,5	59:4 67:16,23	confident 61:17	85:10 87:7
30:14 32:7,10	14:5 20:4,11	76:25 103:14	configuration s 57:9	88:7 90:9
33:15 34:7,8,	30:19 31:3,12	124:14	configured 35:14	92:18 93:5
19 35:6,17	32:3 50:21	compound 21:17 47:6	confirms 65:9	114:12
50:18 52:13	51:6 56:21	comprise 98:22	conflict 78:14	135:23
56:18 64:20	96:1 111:3	computer 7:10 111:5,9,	confused 50:14	consisting 31:6
71:3 116:22,	communicati ons 13:3 19:24	13	confusing 94:6	consists 124:13
25 117:8	138:19	concedes 143:25	connected 21:10,15,16	135:18
119:2,14,19,	compared 125:21	concept 132:8	22:10,16	constant 121:16,21
20 120:22	comparing 86:19 137:1,	concerned 49:14 98:10	70:19	125:2
121:4,11	5,19,25	conclude 132:16	consideration 103:13	constants 119:16
123:4,20	comparison 133:12	concludes 133:14	considered 46:17 49:16	constraints 114:7
124:11	143:14	conclusion 134:7,10	110:9 121:2,	construction 13:1,5 14:21
127:11	compensate 139:21,24	135:14 136:5,	23 126:15	15:2,5,7,8,13,
139:10	141:14	10 140:16	considers 122:14,25	14,15 27:22
columns 35:5	compensated 16:24		consistent	42:16,19,20
combinable 111:13				43:12,16
combination 104:18				44:3,7,9,10,
combine 104:7,18,23,				14,17,20
25 105:15				45:3,13,19,22
110:19				56:8,11 59:1
111:18 115:5,				63:22 64:8
7,15				68:21 69:3,8
				72:6,17,21
				73:10,11
				77:18,20,24
				78:10,20
				79:2,5,20,25
				80:5 81:3,5,

19,22 82:2,4, 8,14,21 83:2, 9,12,20 84:13,22,25 85:1,3,7,12 86:8,11,18 87:3,5,14,21 89:7,10,14, 22,23 90:2,6, 24 91:4,5 92:1,11,12 constructions 90:3 construed 43:22 44:6 80:3 consume 34:4 41:23 47:12 59:13, 15 101:5 126:14 consumed 33:14,16 34:3 43:22 44:20 50:3,24 58:12 64:24 65:7 68:16 80:13, 20 81:7,9,10, 24 82:22 83:3,21 84:23 85:2,13,20,23 87:22 96:5 98:7 101:8 117:14 123:20 126:25 consumes 55:19 consuming 45:24 46:1,9, 12,14 47:2,	11,15 49:10 51:3,9,17,19 52:1 53:16 54:15 55:10 57:16 58:14, 21 59:9,18 64:3 65:17 66:4 67:1 68:23,24 69:5,9,14,22 70:12,15 72:13 77:8, 11,13 108:5 126:12,19 consumption 30:25 31:7,17 32:15 33:19, 25 34:9,12 35:3,13 43:9, 22 44:11,19 45:3 47:21 49:19 50:7,9 52:3 60:14,25 61:6 62:7,8, 25 63:13,23 64:24 65:9,25 68:16 71:7 72:17,25 73:2,3,5,7,14, 15,19,21,24 77:21 78:7 79:12 80:3, 12,13,18 81:23 83:2,20 84:16,18,19 85:6 87:18 88:4 90:8 95:2,21 96:2, 17 97:8,13, 16,18,19,22 98:1,6,11,12 99:15,21,24 100:1,2,6,8,	15,17,21,22, 24 101:14 103:7,13,22 104:2 105:6, 23 107:23 108:1,15,19, 22,25 121:17 122:15 125:10 126:21,24 128:8,13,15 129:6 134:2, 13,16 136:7,8 contacted 13:24 contemplates 91:9 content 14:5 contents 7:21 8:20 9:4 context 22:2 28:14 40:10 48:14, 16 49:6 51:4, 25 52:23 53:13,17,24 54:8,23 59:19,20 62:6,22 63:19,23 67:12,17 70:9 71:17 72:11 75:8 84:7 98:14 115:8, 15 136:12 142:23 continue 77:25 117:23 continues 60:12	continuing 119:1 contrary 91:8 contrast 65:11 contribute 43:8 50:7 121:7 contributed 54:16 control 77:1,2 99:20 100:23 101:11 102:19 106:22 107:6, 11,14,17,21, 22,24,25 108:11,12,13, 18,24 135:6 137:11 controller 24:8 25:19 converter 67:14 converters 96:6 COOK 6:12,22 10:4 12:1 13:6 14:7 15:1,20, 24 18:10,17 19:11,15 20:5 21:14,21 22:23 23:7,23 24:10 25:15 26:17 27:16 28:3,23 29:3 30:13 31:19	33:23 36:1,8 37:10,24 38:3 39:1,18,24 40:2,19 41:20 44:24 46:19 47:13,24 48:20 50:13 52:11 53:1,9 54:2,19 55:3 56:17 57:18 58:6 59:6,16, 24 60:2 62:11 65:1 67:11 69:12 70:1, 10,23 72:14 73:17 74:4,8, 24 75:15 77:6 79:1 81:13,17 83:11 84:3 87:9,12 88:17 89:2 90:5,13, 16 92:22 93:9,12,16 95:8 96:9 97:17 98:5 101:1 102:8, 12 104:3 108:17,23 109:8,13,16 112:7 113:6, 22 114:1 115:9 117:18 118:8 124:1 126:17 127:9 130:1,8,16,22 131:9,19,22 136:3 138:11 139:2 140:17 141:10 142:15,24 143:7,19 144:10,16,23 copy
---	---	--	--	--

7:16,21 9:2,3 corner 20:17 correct 14:14 16:23 17:1 20:8,21, 25 21:7 23:1, 10 24:12,25 26:5 28:25 29:6,10,15 33:9,14 40:9 45:17 53:14 55:6 62:7 68:19 69:5 70:25 71:5 72:7,19 75:8, 12 78:12 79:4,21 80:8, 15 81:19 83:5 84:14 85:9 86:9 92:25 95:2,21 96:12,18 97:10,22 99:22 100:10 103:22 105:23,25 106:5 107:20 114:9,11,14, 20 115:12 116:21 117:5 119:10 121:14,19 122:13,16,20 124:8,10,19, 22 125:1,2,18 126:12,21,23 127:4 129:12 130:4,18 132:17 133:15,21 134:2,19 136:10,17	137:6,21 138:10,17 140:18 142:4, 12 143:3 correction 139:23 141:12 correctly 57:8 87:24 130:21 136:11 counsel 6:9 11:24 12:2,4,9 13:7, 11 14:1 16:16 27:19 39:16 59:10 74:2 130:19 couple 13:17,18 37:24 43:19 121:24 coupled 35:4,13 70:19 71:4,5 127:4 court 6:5,18 14:12, 22 15:3,9,12 17:13 18:22 19:3 33:5 44:4,7 56:7 61:5 73:10 80:5,19 81:18 82:10 86:9 87:2,17 88:2 90:20,23 91:15,25 144:20 145:1, 5 court's 43:16 44:14,	17 45:21,22 80:11 81:3,5, 19,22 82:21 83:1,9,19 84:12,22 85:12 87:13, 14,20 89:10, 14,23 90:2,6 91:3 92:11 courts 59:1 89:6,7 cover 8:22 coverage 134:1,13 136:6 criteria 100:1,23 criterion 139:11 critique 87:4 88:16 cross- citations 114:23 CSR 6:8 CT 145:8 Cui 113:12,17 114:12,13,16, 18 115:17,18, 21,25 116:20, 23 117:2,8 118:2 119:6 122:4,12,17 127:3,19 129:9,15	130:3,9 current 34:3 50:5,24 52:3 55:10,19 77:9,12 125:11,15,21, 25 126:2,4, 16,19,20,25 curves 137:5,18,24 139:4 D DAC 103:13 116:6, 12 Dallas 6:10 7:2 dash 103:9 data 22:3,8,10 26:2 29:4 30:23,25 31:2,4 36:21 40:8,12,14 45:4,14,16,18 54:21 60:15, 17,22 61:1 62:3,10,14 66:14,15 71:15,23 77:22 78:8, 11,14,18,19 79:4,13,20 117:19,20 118:4 date 18:5,12	day 13:20 128:23 deadline 117:9 119:21 dealing 13:1 decision 12:24,25 60:6,9 61:7 77:16 declaration 7:15,16,22 8:24 11:22 12:18 15:4,5, 6 16:3,11,20 17:10,11,17, 18,22,25 18:3,6,12,23 19:7 31:20 36:7,24 37:7, 9 38:16 39:8, 12,13 40:3,6, 23 42:15 45:1 50:17 55:17 56:1,15 59:5 65:3 68:14 80:2,9 82:19 86:1 87:8,16 94:10,13,17 96:22 98:16 99:8 102:23 103:1 104:5 109:9,18 110:24 132:12 143:21 decoder 23:19 24:7 25:19 deep 46:15
---	--	--	--	---

define 60:13,25	describes 22:19 28:14, 20 49:23	devices 20:4	129:2,5 131:8	94:16 103:4, 20 104:21 105:4,9
defined 61:5 119:16 121:15	109:22 129:15	die 142:7	disclosed 22:22 105:5 111:2 118:12 127:8,22	discussion 19:10 89:9,21 90:4 96:15 98:17 108:22
defines 76:17	describing 29:24 37:20 53:19 65:25	differ 127:21	129:7 131:13 140:12,25	
defining 121:16	67:24 84:17 95:13,15	difference 85:19 143:9	141:23 143:6, 13 144:8	disparaging 132:16
definition 27:15,21,22 28:2,6 30:8 76:16	96:24 101:19, 21,22 102:2,6 103:24	differentiate 43:6	discloses 106:4 107:2 112:16,20 129:2,6 143:8	dispute 89:12
delivery 145:7	111:16 112:1 116:23 119:7 120:21 121:4 125:23 128:1 139:15	digital-to-analog 67:14	disclosing 100:4,5 103:5 105:12 110:16 115:8, 15 117:25 119:8 120:9 123:24	disputed 90:2
depend 39:3,5	description 27:9 29:23 118:10	direct 39:13 43:15		disputing 107:24
depending 28:13	designated 32:18	directed 31:9,25 100:16	disclosure 23:11,17 108:12 115:13 128:3, 5,6,7	district 14:12,22 15:3,9,12 17:13 18:22 19:3 44:3,7, 14 45:21 56:7 61:4,5 80:5, 11,19 81:2,18 82:21 83:1,9, 19 84:12 86:9 87:13 89:6 90:20
Depends 22:2	designed 125:12	direction 23:16		district's 81:22
depicted 20:20 106:8	desirable 143:2	directions 23:14	discuss 20:3 61:20 74:9 94:10 98:18 136:4	divided 36:9,18
depicts 116:1	detection 96:1	disagree 25:13,16,20 42:15,18,21 43:1,12,13 45:10,19 60:20,21 62:1 63:24 72:9 78:15 79:14 88:18 91:13 108:10 109:6 116:14,18 140:19,24	discussed 12:10 25:17, 19 96:10 102:23 141:22	dividing 17:14
deposed 8:12,16 10:11	determined 101:13		discusses 71:3,4 100:22 108:15	doable 144:25
deposition 6:7 7:4,11 8:6,9 9:6 10:9,14,24 11:18 12:11 13:11 17:8,19	Development 11:11,16	disagreement 26:19 77:20 78:16	discussing 65:5 70:20 73:3 87:18	Doctor 40:3 109:17
describe 27:4 48:9 58:25 62:18 64:14 95:16 127:17	device 8:2,5 98:7 99:11 106:4, 8,14,18,21,24 133:10 134:17	disclose 106:16 110:1		document 8:25 15:20

16:20 87:15 documents 7:19 8:20 13:1,4 15:11 115:6 dominated 125:11 doubling 133:8,19 download 9:22 draft 144:24 145:3 drafts 144:21 drain 142:6 driving 41:9,16 137:8,15 138:10 143:16 due 34:3 50:4,24 52:3 53:16 142:2 duly 6:18 dynamically 103:24	Ea 121:16 earlier 25:17,21 37:13 45:13 67:2 80:1 136:15 easily 121:25 124:6 Eastern 14:12 edits 16:17,19 effect 82:7 effectively 9:16 effects 34:4 50:4,6, 25 51:12 52:4 53:18 efficiency 36:12,19,20 efficient 133:20 electronic 7:16,19 Electronics 10:25 11:1,6 elements 103:17,18 embodiment 25:6,7 26:6 29:12,16 30:11 36:17 37:20 38:24 67:4 95:15,16 108:3	embodiments 22:22 62:19 63:3 64:14 95:6,9,13,19 96:12,17,25 99:24 100:16 105:5 107:19 Empire 11:10,15,16 13:22 88:2 enabled 44:22 82:5,7 85:22 86:12, 15 87:2 90:22 91:2,4,7,18, 25 92:3,8,16, 21,23 encoder 26:3 29:5,8 encoding 22:9 66:14 141:12 encompass 18:25 end 122:2 135:1 ending 79:10 energy 30:25 31:7, 11,17 32:2, 12,14,17,22 37:12,16,17 94:22,23 101:6 103:7 104:1 108:6 114:6 118:18 121:17,23 122:2 124:12 127:13,15,16	139:17,18 140:9,20,22 141:1,2,6,21 142:2,3 entire 34:16 58:16 98:14 100:12, 13 135:24 entitled 132:2 environment 135:6 equal 30:6 67:8 118:15 121:11 123:25 124:7, 23 126:8,10, 15 equals 121:24 124:3 126:6 equating 79:12 equation 32:9,12,15, 19,21,23 33:21 34:8, 15,16,19,21, 23 35:17 36:16,25 37:2,6,11,13, 15,19,20 38:4,18 103:12 119:17 equations 139:14 equipment 134:4	error 139:23 141:12 essentially 79:18 117:15, 25 118:22 125:23 estimate 17:6,14,16 Eta 36:10,18 evidence 61:8,21,24 63:25 86:6 110:17 131:12 exact 28:2 76:16 EXAMINATIO N 6:21 examples 22:21 28:18 38:21 76:8 99:3 144:1 exclude 60:15 62:2 79:3,5,16 excluded 79:8,16,20,24 excludes 62:12 exclusively 125:18 excuse 77:21 executing 66:7
E				
E-BASIC 103:6 e-mail 7:23 145:3				

exhibit 9:23 10:1,2,5, 8,24 11:10 12:23 15:21, 22,25 16:2,3, 7 19:12,13, 16,18,19 31:21 42:23 43:14,15 44:16,18 59:24,25 60:3,5 77:16 81:7,13,14, 16,18,21 87:9,11,13 90:13,14,17, 19 93:13,14, 15,17,19,23, 25 94:2,5,8 102:9,10,13, 15,17,21 113:22,23 114:2,4,5 115:22 131:19,20,23, 25 132:1,2 141:24	128:25 129:2 explain 22:5 explains 117:8 explicit 84:10 explicitly 25:6 34:1 77:3,4 127:6 expressed 37:18 38:20 expression 36:15 124:12 expressly 84:13 132:16 extend 42:12 extent 24:8 49:15 77:1 91:6 extra 92:9,21	26:1,6,11 33:11 34:14 36:22 38:13 42:13 46:13 89:5 94:7 96:13 103:16 116:13 fairly 137:10 fall 78:19 familiar 9:5 faster 138:5,13 142:7 feasible 132:9 feedback 23:19 24:7 25:19 feeding 70:18 feel 127:7 figure 20:6,8,13 22:22,24 23:9,25 24:12,24 25:2,9 26:6 27:4 28:19 29:7,11,13,24 30:12 37:3 53:22 55:7 76:9 77:4 98:16,18,19, 20 106:2,4,8, 13 115:23 116:1 122:5,	19 127:3 134:25 135:1, 2 136:4,7,14 139:4 143:17 144:1,9 figures 123:4 127:17 134:24 135:11,15 136:16,19,21 137:4,17 filed 14:3 filters 67:19 116:6, 12 final 15:15 44:8,10 45:22 61:6 80:9,11,23 82:3,8,14 85:4,7,12,23 86:1,8,20,24 87:3 89:10,21 90:24 92:1,12 121:2 139:11 144:24 145:7 finalize 17:17 find 105:7 finding 32:13 findings 61:23,25 fine 6:12 33:4 39:25 85:3,4 109:13	finish 9:9 37:25 61:11 78:1 88:23 finished 39:16 118:2 122:4,17 finishes 127:19 five-minute 144:11 fix 105:7 flawed 74:16,22 75:13 flow 96:15 flowing 23:18 focused 62:21 focuses 68:12 focusing 25:7 63:18 70:16 98:11 foot 41:10 42:2 form 14:23 18:7 20:2 21:11 22:17 23:2 24:6 25:12 26:12 27:13 28:12 29:1 30:3 33:20 35:23 37:4 38:14 40:15
exhibits 9:22 11:23 12:13,16,17, 20 94:4 exists 104:16 expanded 66:10 expedite 144:24 expert 14:18 66:17 89:5,6,12,24 105:18	F fact 72:15 79:23 87:2 91:25 110:13,21 111:12 factor 139:13 factors 141:9,11 fair 20:1 24:1 25:11,24			

41:14 44:15 46:11 47:4,16 48:4 49:11 51:20 52:21 53:5,23 54:6, 22 56:2 57:3 58:2,22 62:4 64:4 69:6 70:4 72:8 74:15 76:23 78:22 83:7,24 88:14,24 89:19 92:4 93:1 95:3,22 97:14,23 100:19 103:23 108:9, 20 109:2 115:1 117:16 118:6 126:13 127:5 129:17 130:5,12 131:1 134:20 138:8,22 140:11 142:13 143:4, 11	front 7:21 8:24,25 42:22 frowned 92:11 full 6:24 46:24 53:13 90:25 103:16 fully 42:9,10 88:2, 8 function 33:13,16 34:20 37:13 138:6,14 139:7 143:10 funny 58:4 G gain 134:12,23 136:9 gas 41:23 42:3 gave 25:21 41:25 42:23 51:14 75:8,12 135:23 general 27:2,6,11 39:2 generalization 131:2 generalize	133:13 generally 30:18 92:23 138:13 143:8 generated 22:8 40:18,20 gestures 9:14 give 9:14 27:21,23 37:24 105:20 giving 28:6,7 41:8 Goldsmith 113:17 114:14 good 6:5,23 17:6, 15 37:23 74:3 109:11 Gore 91:16 governs 38:10 granting 60:6 graph 137:19 graphs 137:25 138:12 great 145:6 Greek 32:24 33:1 36:10,18 green	41:7,12 ground 9:6 group 31:5 guess 47:22 50:14 90:24 114:9 125:5 H hardware 54:14 57:20 64:5 65:19 hearing 15:8,18 helped 16:15 helps 33:5 high 20:3 27:23 higher 31:16 hindsight 104:13 105:1, 17 110:19 111:15,19 131:14 140:13,14,19 141:15 history 61:4 86:6 holds 72:21 home 7:1	hook 104:16,23 hope 111:18 hour 13:9 16:22,25 37:22 74:3 109:11 135:4, 5 137:9 138:10 hours 13:17,18,19 17:2,4,5,7,11, 12 hypothetical 47:22,23 48:6,13 51:14 56:16 58:24 59:4 78:24 135:17 139:1 141:15 142:22 hypotheticals 47:18,19 I ideal 134:23 135:7, 17,21 136:1 137:11,12 138:9 143:15 identified 95:20 100:7,9 102:25 104:20 identifies 105:13 107:20 108:5 identify
--	--	---	--	---

55:14 104:16 idle 33:9,19,25 34:3,12,13 40:9,11,24 42:5 43:2,8, 21 44:19 45:24 46:1, 10,13,18 47:2,11,12, 15,21 48:16 49:6,10,18,21 50:3,7,12,20, 24 51:3,5,9, 17,19 52:1 53:14,16 56:20 57:15, 16 58:14,21 59:9,13,15,18 60:13,25 61:5 62:7,8,24 63:12,23 64:3,24 65:7, 9,17,24,25 66:4 67:1 68:16,23,25 69:5,9,14,22 70:12,15 71:7,17 72:2, 4,13,17,24 73:2,3,4,7,14, 15,18,19,20, 23 75:11 78:6 79:12 80:3,12 81:9,23 82:12 83:2,20 84:16,18,19 85:6 87:18 88:3,9,12,20 89:17 90:8,11 94:20 95:2,20 96:3,17 97:13,18,19,	21,25 98:1,2, 3,6,7,11,13, 14 99:20 100:2,6,8,11, 12,14,17,22, 24 101:5,13, 20,21,23,24 102:2,4,5 105:22,24 107:22 108:1, 6,14,19,21,25 109:3,4,5 127:23 128:1, 3,7,10,13,14, 15,17,21 129:5,6,7 idled 41:11 idling 34:4 41:5,19, 24 42:7 43:7, 8 50:2,22 51:1 52:5,14 53:20 54:3,24 56:22 57:12 65:6,10 66:1 74:13,18,20 75:1,5,16 101:8 II 125:11 illustrated 25:3 illustrates 20:10 implemented 106:12 111:10,20 imply 38:22 48:13	import 64:16 important 9:8 82:16 135:1 improve 104:9 improvement 133:15,16 137:23 improving 132:9 inaccurate 85:18 include 18:14 19:7 24:22 49:20 78:10 82:22 83:2,21 included 18:5 64:2 includes 17:7 18:24 21:9 55:5 65:19 86:11 103:12 106:14,18,21, 24 112:17 116:5,6,11 121:18 including 78:7 112:21 incoming 94:20 96:3 101:20,25 102:4 109:4 incomplete 47:23 48:6 138:25	141:15 142:22 inconsistent 45:13,20,21 47:10 61:22, 24 63:25 69:19 incorporate 124:7 126:8 incorporated 16:19 incorrect 17:23 incorrectly 42:25 increase 138:13,18,19 139:6 140:21 142:3,6,10,16 143:9 increased 139:16,17 140:4 increases 138:5 142:25 index 33:10 individual 48:12 55:14 56:3,13 59:3 67:16 information 11:21 23:18 120:16 input 14:2,8 31:2,4 inside 26:4 32:21	institution 12:24,25 60:6,8 77:16 intend 92:16 interested 100:20 112:24,25 134:16 interference 142:8 interpret 57:7 78:6 interpretation 61:9,10 intrinsic 86:6 introducing 133:20 invention 141:16 investigation 110:22 invite 61:14 inviting 61:20 involve 21:22 22:1 involved 13:21,24 14:16,21 27:25 28:17 involvement 15:2 involves 29:13
--	---	--	--	---

IPR 7:17 10:12,14 13:21,25 14:3 16:5,23 17:2, 5,20 60:7 89:18 93:25 94:5 102:16	kind 34:18 137:11	120:24	94:8,9,16,18 95:1,4,6,12 96:11,16 97:3,13 98:4, 12,13,16,22 99:4,10,18 100:1,7,9 101:2,4 104:7,9,21 105:3,5,7,8, 12,20,25 106:1,4 107:2,10,25 108:5,13,15, 22 109:20 110:19 111:2, 13 112:16,20	limiting 72:22 79:17
isolated 132:23	knowledge 17:24	leakage 34:3 46:16 49:15,20,21, 22 50:4,5,10, 24 51:11 52:3 53:17 55:10, 19 77:8,12,13 125:25 126:2, 4,12,16,19, 20,25	lines 34:7,18 35:17,18 38:4 50:18 52:13 56:19 71:22 118:23 119:13 121:24	
issue 22:11 61:15	koo-wee 114:8	leaking 125:11,15,21	list 103:16	
issued 15:12	L	leaning 61:16	listed 10:25	
issues 59:21 105:10	L-I 93:21	learning 112:25	litigation 14:11,16,19, 22 15:9	
italicized 33:4	labeled 20:14 22:21 28:24 98:24 136:16	leave 58:1	Li's 95:9,17 98:20 99:23 100:16 106:8,14,18 107:19	LLC 11:11,16
item 28:19 76:10 81:21	labels 20:10	left 20:17 104:22 136:25 137:7, 15,22 139:10	license 6:8	load 139:13
items 26:7	LAN 112:17,21	legal 89:24 104:12 111:25	lift 42:2	located 7:3,5
ITU 135:11 137:13 138:17 143:16	language 49:3,6,14 53:7 56:4 59:19,21 62:15,19 64:9 67:22,23,24 69:23 73:8, 12,25 74:1 80:18 84:15, 17 85:9 90:23 91:4,5,19 92:9 100:3 143:24	lend 61:15	light 41:7,10,11,16 64:12 86:5	long 13:8
J	LANS 112:12	letter 32:24 36:10, 18	limit 70:8	longer 18:1 90:4
jump 108:16	larger 36:20 144:2,4	letters 33:1	limitation 64:23 100:4	looked 61:8 77:18 111:14 114:19
K	layer 92:21	level 20:3 27:24 56:5,6,8,13 79:22	limitations 64:16 66:25 84:8	low-noise 24:11,23 25:2,5 96:5 103:14
kilobits 136:24	leading	Li 93:21,22	limited 65:19 67:9 73:7 82:13 98:11	lower 31:11,16 32:2 36:21 137:24
kilometers 135:4 137:9				

lowercase 36:11	map 141:17	19	139:7 140:8, 10,20,21,23 141:2 142:11, 18 143:2,10 144:2,3	mixer 68:2 103:13 116:6,12
lumping 28:16	marked 10:1,2 15:21, 22 19:13 59:25 81:16 87:11 90:14 93:14 102:10, 15 113:23 131:20	meant 10:22 17:9		
LUNCHEON 74:6		media 97:6 106:21		mobile 19:25 20:13, 16,20,23 21:2,6,9 22:16 23:8 24:3 26:9 43:23 44:12, 19,21 66:20 68:17,22 69:4 71:7 72:25 73:2,4,9,15, 21,24 80:12, 13,14,16,19, 20,25 81:4,9, 10,11,23,25 82:11,13,22 83:3,13,21 84:4,14,16, 18,19,20 85:6,13,20,24 87:22 88:3, 11,19 89:16 90:8,10 98:24,25 99:5,11 101:18 106:5, 9,11 112:17, 21 128:16 133:10 134:5, 17
M		meet 64:23 66:24	MIMO- CAPABLE 112:17,21	
Mac 106:22 107:2, 11	Markman 15:17 90:19 91:21	meeting 13:7,8,10	minimize 103:7 104:1	
made 91:15,16 116:9 117:3	mathematical 37:20	mention 68:11 105:24 109:20	minimizes 32:14	
maintain 138:20	mathematicall y 37:18	mentioned 8:19 12:13 29:18 86:12	minimizing 32:20	
make 8:4 40:23 46:7 49:21 60:22 62:17 73:12 74:17 75:24 77:19 78:13 80:17 84:2 104:17 108:16 111:13 115:2 126:18 143:1	matter 17:3 57:5 79:13,16,22	met 12:10 46:3 115:16	minus 33:8,18,22	
	Mckinney 7:2	middle 143:23	minute 43:18 77:15 101:2 102:9	
	meaning 27:9,15,17 28:8 43:2 57:8 88:4	miles 135:5 137:9, 16 138:10	minutes 13:9 37:25 39:19,25 109:14	
	means 40:16 43:3 47:11,20 48:21 51:8,23 54:11 57:25 58:8,10,15 62:6,8 65:25 68:16 69:3, 10,17 71:17, 25 75:7 81:24 92:8 93:4 105:11 119:3 120:4 139:16,	MIMO 20:23 21:22, 25 30:23,24 31:6,10 32:1 34:21 35:4,15 71:11,12,13, 17,19 72:10, 11,13 97:7 105:14 107:4, 15 112:12 132:3,8,16 133:2,14,25 134:12,18 136:8,17 137:6,20 138:1,6,12	Mischaracteri zes 30:4	
			mischaracteri zing 28:5 58:5 97:25	
			MISO 97:5	mode 20:23 21:3 30:18,23,24 31:5,6,10 32:1,2 35:15 46:14,15 49:13 70:3,7, 14,16 71:12, 14,22 72:15 94:20 97:6,8,
			misunderstan ding 101:17	
			mix-and- matching 98:2	

25 98:3,7,14 99:12,15 100:8,11,18 101:5,20,21, 23,24 102:2,4 103:7,21,25 104:10 105:14 107:5, 15,16 108:7 109:1,3,4 118:17 119:3, 4,5,10,25 120:3,4 122:25 123:10,14,18, 21,24 125:6, 10,22 126:11, 21 127:3,12 128:10,21 129:5,7,12, 13,15,21,22, 23,24,25 130:2,11,18 131:6,7,11 141:5,20 142:2,4 143:10 144:4	modified 121:25 124:7 126:7 Modulation 114:6 moment 31:21 Monday 144:25 morning 6:5,23 motion 83:16 motivated 104:6,18 110:19 115:7 motivation 115:4 mouth 61:19 move 93:12 104:4 131:19 136:25 moving 41:4,6,18,23 42:3 multiantenna 102:18 multimode 123:5 129:10, 20 multipath 135:9 multiple 19:25 28:16 31:2 35:14 139:24	141:13 multiplicative 38:5 multiplied 33:12,18 96:6 124:18,22 multiplying 33:22 34:10 N N0 38:5 narrower 18:24 63:16 necessarily 93:2 111:22 139:19 140:15 141:8 negative 69:8 negatives 92:10 negligible 121:2,7 126:15 networks 102:19 node 106:12 112:13,18,22 117:9 noise 38:6,10 39:3, 6,10 136:16, 21 137:5,19, 25 138:5,6, 12,13,18 139:3,7,10,	16,20,24,25 140:2,4,7,8, 21 141:3,4 142:2,10,16, 25 143:9 144:1,2,4 noted 145:8 notes 9:1 144:12 notice 10:9,24 Nu 32:24,25 nuance 83:16 number 6:8 10:15,21 23:21,22 44:18 50:20 56:19 93:20 96:7 133:9,19 136:7,23 138:7,14 143:1,10 numbers 94:5 107:7 O oath 7:6 Object 56:2 143:4 objection 14:23 18:7,15 20:2 21:11,17 22:17 23:2 24:6 25:12 26:12 27:13,	19 28:12 29:1 30:3 31:13 33:20 35:23 36:5 37:4 38:14 40:15 41:14 44:15 46:11 47:4,16 48:4 49:11 51:20 52:21 53:5,23 54:6, 22 57:3 58:2, 22 59:10 62:4 64:4 67:5 69:6,15 70:4 72:8,20 74:15 75:4 76:23 78:22 83:7,24 88:14,21,23, 24 89:19 92:4 93:1 95:3,22 97:14,23 100:19 103:23 108:9, 20 109:2 113:4 115:1 117:16 118:6 126:13 127:5 129:17 130:5, 12,19 131:1 134:20 138:8, 22 140:11 141:7 142:13, 20 143:11 obvious 105:19 offer 133:15,16 offering 73:25 officer 6:7
--	--	---	---	--

one-path 135:2,3,5,13, 16,20 137:10 138:9 143:15	87:1 88:6,15 89:1,4,7,10, 18,25 90:12 91:14,24 92:2,13 93:3 98:9 104:20 108:13 110:15 111:21 115:10 116:16 129:3 131:3,4 135:23 138:23	141:21 order 15:16 64:2 70:12 87:14 89:25 104:13 110:8 120:12 122:6,19 orders 15:11 ordinary 27:8,14,17 28:8 43:2 64:11 65:21 output 31:2,5 overlap 17:12,15 Owner 11:9,14 14:1, 3,9 65:8 Owner's 16:4 19:9	112:8,11 113:8,16,19 114:13,18 126:10,23 135:24 136:13 139:9, 14 140:15 141:22 143:13 papers 113:3,8 114:19 141:17 paragraph 31:21,24 34:2 40:4,6,22 41:8 42:14 43:20,21 44:25 49:24 50:16,17 65:2 67:12 68:14 78:4 80:2 88:1 90:25 94:14,17,18 95:5,11,12, 13,16,17,20, 23,24 96:11, 12,24 97:2, 20,21 98:3, 15,19 99:4,8 100:9 101:3, 15,18,19 103:2,4,11,16 104:4,7 105:13 106:6, 11,16 107:2, 10,20 108:5, 24 109:8,18, 20 110:24 111:1 117:7,8 118:13 119:1, 2,20 123:3 125:5 127:11	132:13,15 134:10 143:20,23 parameter 118:16 parameters 32:21 paraphrase 42:25 paraphrasing 116:3 118:11 parked 42:9,10 part 24:13 25:18 26:13 28:17, 20 30:1 31:7, 10 32:1,5 34:15 40:10 42:18,20 43:12,13,14 45:10,13,15, 18,19,21 48:12 55:7 56:4,8,11 60:21,23 61:9 63:24 66:6, 12,16 67:23 68:8 73:1 76:24 77:1 79:6 82:16 89:17,21 99:16,20 100:24 106:12 108:14 110:15 parties 61:14,20 89:8 parts	
open 7:9,13,14,15, 19,24 10:1,3 15:20,23 19:12,14 59:24 60:1 90:15 93:15 102:8,11 131:21	open-ended 104:22 105:6 operating 97:5,8 99:12 107:5,15,16 130:24 operation 97:12 opinion 21:18,19 25:4 26:22 35:25 36:6,23,25 39:7,10 42:17 43:25 45:23, 25 47:18 48:15 55:18, 25 57:14 58:23 59:7 60:23 61:13, 22,23 63:24 66:19,22 67:12,15,19, 21 68:1,5 69:8,16,20 70:5 78:23 80:7,10,11,24 81:2 82:16,18 84:8 86:17	opinions 16:21 17:25 18:3,4,13,22, 25 19:2,4,8 24:2,9 25:1 37:1,6 38:15, 17 39:8 44:9 47:19 48:7,8 55:11,13 56:6 59:22 62:21 63:2,15 67:17 70:6 73:25 80:10 85:10 86:3 87:6,7 115:3 optimization 114:6 optimize 118:17 optimized 32:13,17 37:12,16,17 140:9,20,22 141:1,2,6,20 142:2 optimizing 103:20	output 31:2,5 overlap 17:12,15 Owner 11:9,14 14:1, 3,9 65:8 Owner's 16:4 19:9	papers 113:3,8 114:19 141:17 paragraph 31:21,24 34:2 40:4,6,22 41:8 42:14 43:20,21 44:25 49:24 50:16,17 65:2 67:12 68:14 78:4 80:2 88:1 90:25 94:14,17,18 95:5,11,12, 13,16,17,20, 23,24 96:11, 12,24 97:2, 20,21 98:3, 15,19 99:4,8 100:9 101:3, 15,18,19 103:2,4,11,16 104:4,7 105:13 106:6, 11,16 107:2, 10,20 108:5, 24 109:8,18, 20 110:24 111:1 117:7,8 118:13 119:1, 2,20 123:3 125:5 127:11	parameter 118:16 parameters 32:21 paraphrase 42:25 paraphrasing 116:3 118:11 parked 42:9,10 part 24:13 25:18 26:13 28:17, 20 30:1 31:7, 10 32:1,5 34:15 40:10 42:18,20 43:12,13,14 45:10,13,15, 18,19,21 48:12 55:7 56:4,8,11 60:21,23 61:9 63:24 66:6, 12,16 67:23 68:8 73:1 76:24 77:1 79:6 82:16 89:17,21 99:16,20 100:24 106:12 108:14 110:15 parties 61:14,20 89:8 parts

26:15 43:4 85:17 103:18 past 13:17 89:11 patent 10:14,17,18, 19 11:9,14 12:22 14:1,2, 9,13,19,22 16:4 18:5,14, 21 19:1,2,5,9, 19,20,21,24 20:6 22:14, 15,18 27:1,3 28:14 29:19, 20 30:9,14, 17,18 31:9,25 32:8,9 40:7, 11 49:18,19 50:18 52:13 60:13,24 62:2,12,16 63:17 64:19 65:8 71:2 76:8,17 84:7 102:6 105:2 109:21 127:22,25 128:10,12 141:16 path 26:2 28:11,25 29:4,7,9,14 116:1,5,11 118:18 122:6, 19 127:13,15, 18,21 135:7 pdc,s 34:25 35:3,9, 11 PDF	7:14 pending 39:22 per-packet 104:1 percent 61:17 94:21, 22 101:5 108:6 131:14 133:3 Perfect 144:13 performance 132:2,9 139:11,20 performed 109:22 110:3 133:3 performing 97:12 136:23 period 116:24 117:3, 4,15,20 periods 117:3 person 64:11 65:21 petition 12:19 18:23 19:6 37:1,7 48:8 115:20 Petitioner 10:25 11:4 94:12 102:24 104:14 105:18 114:5 115:2 134:24 140:13 143:18	Petitioner's 10:9 66:17 105:18 PH.D. 6:16 phone 8:1,5 80:25 81:4 134:5 phrase 57:14 58:15 64:7,18 65:5 71:6 82:8 86:12 87:2 96:19 112:8 128:14,15,21, 24 129:5 phrased 85:18 phrases 85:17 98:2 physical 7:20 8:20 110:1,2,8,14, 22 111:10,20 Pidle 33:18,21,24 piece 73:16 94:11 pieces 104:25 105:1 place 10:10 plain 27:8,14,17 28:8 43:2 66:22 plug 80:21 82:15	point 45:2 49:25 51:4 52:24 53:13 54:9,24 57:10,23 61:9 64:10 73:8 77:19 91:22 94:18 98:21, 23 102:1 106:12 111:15,22,23 118:10 121:9 127:7 pointing 50:16 62:17 75:21 91:2 95:1 136:1 points 143:18 Pon 124:17 portion 22:25 23:1 47:14 78:4 91:3 POSITA 28:7,10 34:5 52:7 54:9 57:4,9,22,24 61:2 64:6 66:11 76:18 77:4 86:4 88:7 96:14 104:6,15,17, 23,24 105:7, 19 108:14 110:18 111:1, 14 112:24 113:7 114:24 115:6 130:23 131:4 134:16	135:14,24 140:5,14 position 47:1 positive 69:9 possibility 22:4 power 24:13,15,19, 22 33:13,16, 19,25 34:3,5, 9,12,20 35:3, 8,10,11,13, 21,22,25 36:3,4,11,16, 19,20 38:6,9, 10,20 43:2,8, 21,22 44:11, 19,20 45:3,24 46:2,10,13,14 47:2,11,12, 15,21 48:16 49:6,10,18, 19,23 50:3,7, 9,11,12,24 51:3,9,17,19 52:1,2 53:16 54:15,16,17 55:5,9,19 57:16 58:12, 14,21 59:9, 13,15,18 60:14,25 61:5 62:7,8,24 63:12,23 64:3,24 65:7, 9,17,25 66:5 67:1 68:16, 23,25 69:5,9, 14,22 70:13, 15 71:7
---	---	---	---	--

72:13,17,24 73:2,3,4,7,14, 15,18,19,20, 23 77:14,20, 21 78:7 79:9, 12,22 80:3, 12,13,18,20 81:6,9,10,23, 24 82:12,22 83:2,3,9,20, 21 84:16,18, 19,23 85:1,6, 13,20,23 87:18,22 88:3 90:8 95:2,20 96:2,3,5,17 97:8,13,15, 18,19,22 98:1,3,6,7,10, 11 99:14,20, 24,25 100:2, 6,8,14,17,21, 22,24 101:7, 13 102:19 103:13,21 105:5,22,24 107:22 108:1, 14,19,21,25 116:7,12 117:14,15 118:4 121:1, 2,3,7,8 122:6, 14,19,25 123:20 124:18,22,25 125:10,25 126:6,12,14, 19,20,24,25 127:21,24 128:2,7,13,15 129:6 138:20 139:21 140:1, 3,7,8 141:3,4 142:6,7	power- controlled 112:11 powered 40:24 43:24 44:13,21 55:9 60:15,16,22 61:1 62:2,9, 13 63:6,11 64:22 65:11, 12,16,21,23 66:1,2,4,19, 21,23 68:18, 22 69:4,10, 14,17,18,20 70:3,12 71:10 72:7,16,19 80:14,22 81:11,25 82:17,23 83:4,10,13, 14,16,22 84:1,6,9,14 85:21,24 87:23 88:3,8 91:8,10 92:24 130:24 Powersp 118:21 124:3 PPDU 107:3,12 precise 43:17 preliminarily 78:6 preliminary 14:2,8 15:15 42:16 44:3,6, 14,17,20 45:3,22 61:6, 23,24 80:4,23	81:19,22 82:21 83:1,9, 12,20 84:13, 22 85:1,19 86:2,7,11,18, 20 91:3 prepare 11:18 12:10 13:11 preparing 17:8,9,11,19 present 12:4 previous 34:2 42:14 58:17 previously 10:6 92:6 principle 112:1 principles 104:12 printed 8:19,24 prior 12:18,21 19:6 67:9 94:11 110:7,9 privileged 11:21 13:3 14:5 problem 95:1,2,25 96:17 97:13 99:24 100:6, 8,9,17 104:16,19,20, 22 105:4,6,8 107:20 108:4,	19,25 110:16 111:17 problems 95:6,14,18,19 96:10,11,14, 18,25 105:13 proceeding 6:8 7:17 16:5 94:4 proceedings 22:12 93:21 process 9:6 16:18 65:20 processes 27:25 28:4 65:20 66:6,7, 8,11 76:19,22 processor 77:1 106:22 product 34:12 pronunciation 114:10,11 proper 84:25 properly 125:12 propose 112:11 prosecution 61:3 86:6 protocol 103:6 111:4,8 112:12 provide 7:1 9:19 14:2, 8 16:17 47:19	56:5,6 86:17 89:9 100:1 134:1,12,18 136:9 provided 27:9 30:8 31:17 42:19, 21 43:14 44:17 55:11 61:12 67:15 81:8 87:4 88:6,15,25 providing 63:2 76:15 115:3 Psp 117:24 121:24 124:4, 7,21 Pt 117:24 118:23 119:15 121:11,22 PT/10:05 6:2 PT/3:16 145:8 PTAB 61:10 Ptr 122:1 124:24 publication 93:20 109:21 publications 113:3 put 41:10 61:18 73:12 74:17
--	---	---	---	--

104:14	quoting 125:4 130:9	64:7,11,15 87:24 91:7 96:20 129:1 130:20 133:13 136:11	receive 23:8,17 24:4, 24 25:10 102:7 107:3 133:3,9,19	red 41:10,16
Q	R			reduced 97:9 99:14,25
question 18:8,16,19 19:3 21:20 22:12,13 26:23 29:2 30:5 38:23 39:14,22 44:23 46:22, 24 47:5 51:21 55:17,21,23 56:14 57:8 58:9 74:16, 17,21,22 75:1,13 76:14,15 78:2 82:25 83:8,17 85:18 91:22 93:11 101:10 106:7 107:8 110:12 112:19 120:7 122:22 130:14 139:5 142:14,23	R-A-Y-L-E-I- G-H 135:3 radiated 35:21,24 36:3 raised 19:6 Raising 140:3 rate 16:25 31:1,4 32:13,14,17, 18,22 36:21 37:12,16,18 38:11 39:2,11 136:22,24 140:20,23 141:2,6 142:2 rates 30:23,25 31:8 140:9 ratio 38:10 138:20 Rayleigh 135:3,5,6,13, 17,20 137:10 138:9 143:15 reach 8:3 reaching 110:6 111:7 read 31:16 35:19 54:9 62:20	reading 78:1 85:16 118:11 130:13 131:4 135:14,24 140:15 ready 59:12 66:15 81:15 92:17 101:21 real 110:22 136:2 realistic 137:14 138:16 143:15 realization 110:3,8,14 realized 136:2 reason 9:19 111:24 115:14 142:11,17 reasonable 113:2,7 reasons 105:20 rebuttal 48:7 recall 12:14 13:23 14:6,10 33:1	received 107:12 receiver 23:4,24 25:8, 18 102:4 107:6,11,14, 16 108:4 135:8 receivers 106:19 receives 21:7 reception 102:5 Recess 40:1 74:6 109:15 144:15 recipe 105:2 recites 70:24 recognize 10:5 15:25 19:16 60:3 93:17 102:13, 17 114:2 131:23 recollection 42:23 record 19:10 100:25 144:14	refer 10:17 11:4,14 93:21,22 94:7 97:19 98:1 132:3 reference 93:22 94:8,9, 11,16 98:14 100:14 102:21,24 103:5,12 104:15,17,24 105:8 106:1 112:3,25 113:10,16,19 115:18 116:20 123:23 131:4, 13,15,16,17 132:4 135:15 141:19,23 143:6 references 19:6 94:10 102:22 104:19 110:7 111:18 112:2 113:15 114:24 referred 11:10 29:19 33:13 87:20 referring 10:18 11:5,15 19:20 32:12

33:24 34:6 38:18 63:6 71:8 93:23 95:19 96:11 98:18 101:7, 24 115:22 136:1	relationship 31:18	repeating 120:24	resort 142:9	13:13,15 112:25
refers 65:9 84:23 95:17 97:21, 25 116:17 127:12	relative 140:9	repeats 134:11	response 14:3 18:23 19:9 25:21 68:4 75:8,12 88:25 107:3, 5,12,16 108:4 110:11	rise 136:16 137:5, 25 139:3,11, 25 144:2,4
reflect 85:19 86:4	released 80:10	rephrase 100:7	rest 58:13 68:10 117:14	rises 137:19
reflected 135:20	relevant 11:23 36:25 37:5 38:17 55:12 59:21 67:22 131:7	replicating 22:3	result 37:8 54:17 77:14 99:15 120:25 121:3 126:15	Robert 6:16,25
reflection 135:10	rely 132:15	reply 16:4 37:1,7	results 133:25 134:22 137:3	role 89:13
reflects 16:20	remainder 117:20	report 14:18	resummarize 96:20	rough 144:21,23 145:2
regular 145:7	remains 118:22	reporter 6:5,7,18 9:7 23:20 33:5 62:5 70:22 93:8 112:6 144:20 145:1, 5	returned 119:5	row 137:7,13
relate 56:11 59:3 110:21	remember 45:8	represent 35:7	returns 118:17 119:3, 25 120:3	rules 9:6
related 10:14 13:5 14:11 17:20 22:14 24:4 26:1 48:17,25 49:2 58:11 66:8,12 68:9 70:17 100:2	remotely 8:16	reproduce 98:16 103:11	reveal 11:21 13:3 14:5	RX 133:5
relates 38:9 59:1	removed 87:2 90:23 91:25	request 97:6 99:11	review 12:16,20,25 13:4 15:17 144:19	S
relating 136:7	removing 92:2	require 63:13 71:8,19 91:7 108:2	reviewed 11:22,23 12:13,17,22, 23 15:11,14	S-I-A-M 102:20
relation 10:12	rendered 21:18 25:4 26:22 36:24 37:6 39:7 58:23	required 69:22 124:13	reviewing	Samsung 10:25 11:1,5, 6 14:14 91:21
	renumber 94:3	requirement 84:17		Samsung's 91:17,18
	repeat 55:22 70:24 82:25 106:7 107:8	requires 72:18 81:3 84:13 100:3 107:23		satisfied 43:4
		requiring 60:14,25		save 118:4 122:6, 19 127:21,24
				saving 118:19

127:13,16	104:10	84:1,5,9,11,	sentences	134:22
scenario	self-capacity	21 85:22,25	132:19	136:20
102:3,6	132:23	86:22 87:23	separate	shown
134:23	self-	92:8 97:6	21:23 76:1	23:4,9,25
scenarios	contained	118:4 120:12	sequence	24:12,24
57:6	105:9 111:16,	124:13	27:25	25:6,10,22
Scheme	17,25	sending	series	26:3,9 32:10
132:3	send	22:3 40:17	28:11	77:4 122:5,19
schemes	22:6 40:8,9,	43:6,7 46:1	set	127:3 134:23
139:12	12,14,18	51:8,23 52:8,	18:24 21:2	shows
scope	43:3,5,7,11,	18,22 53:15	50:11 72:16	20:8,13 29:13
36:7,24 37:9	24 44:13,22	54:8,12,14,18	117:23	138:5 144:7
38:16 39:8	45:4,14,16,18	55:1 58:11,16	119:12	Shuguang
48:14 53:24	46:1,4,6,21	64:6 65:20,22	120:21	113:11
55:17 56:1,15	47:3,8,12	66:2,3,20,23	121:10,18,24	114:13
59:5	48:1,19 49:3,	68:6,7 69:24	123:20 124:3,	shut
Scott	5 50:21 51:6,	86:22 117:13,	23 126:9	118:18
6:6	16,19,24	19,20 118:2	sets	127:13,16
seated	52:2,10,17,	119:4 122:4,	113:16	129:13
6:10	20,23 53:8,	17 127:19	117:22	Siam
section	11,14,15	sends	118:21	102:20,21
37:25 58:16	54:1,4,7,10,	120:15	119:11 122:1	103:4,5,12,20
98:19 105:21	21,25 55:2	sense	setting	104:7 105:15,
113:14	56:20 57:11	46:7 48:11	122:1	20,22,24
117:23	58:18 59:12,	60:22 73:13	share	109:21 110:1,
120:23 134:7	14 60:15,16,	74:18 75:24	9:23	13,22 111:2,
sections	22 61:1 62:3,	78:13 80:18	shared	3,20 112:3,25
119:19	9,13 63:1,12	82:12,14	97:6	113:1,3,8,10,
select	64:23 65:23	84:2,10 96:1	shoes	16,19 114:20
71:11,13	66:24 68:6,7,	sentence	104:15	128:8 141:19,
142:11,17	18 69:1,11,	31:23 51:25	Shorthand	22
selected	18,19,21,23	58:13,17	6:6	Siam's
31:5	74:14,19,21	60:11 61:14,	show	110:18
selecting	75:3,11,17	19 66:18 78:5	29:7 133:25	114:16
30:18,24	77:10,22	88:10,13,19	144:1,2	sic
31:9,25	78:8,11,14,	89:4 99:16	showed	10:19
selection	18,19 79:4,7,	105:11 112:5	144:3	side
99:15,19	13,15,20,23	116:24 124:5	showing	101:9 127:18
	80:15,17,22	125:16 132:5		sight
	81:1,12 82:1,	133:13,17,18,		135:19
	6,7,17,23	23 134:15		
	83:3,10,22	135:25		

sign 144:19	SIMO 21:3 30:23,24 31:6,10 32:1 70:2,7,14,16, 18,19 71:21, 22,23 72:3, 15,22,24 97:7 105:14 136:17 137:5, 20 138:1,5,13 139:7 140:7, 10 141:3,5,6 142:2,10,11, 16,17,25 143:2,9 144:3,4	situations 134:19 136:2 143:3 skill 64:11 65:21 sleep 46:14,15 49:13 117:4 118:17 119:3, 4,5,8,25 120:3,4 122:13,14,24 123:14,18,20, 24 124:22 125:6,10,24 126:8,11,21 127:2,12 128:5 129:11, 13,22,23,24, 25 130:2,10, 18 131:5,6,11	solves 105:4 107:19 solving 95:19 100:17 105:9,12 110:16 111:17 soo-wee 114:9 sort 7:23 38:11 102:2 Sp 121:23 speak 8:5,8 speaks 39:12 specific 21:19 26:23 32:22 64:15 73:16 115:13 specifically 12:18 39:13 47:17,21 62:21 78:6 81:6 91:9 98:8 100:14 specification 20:12 24:18 26:15,16 32:6 47:10,20 49:25 50:1 62:16,18 63:3,19 64:12,13 65:24 66:10 68:9,11 86:5 91:6,9 92:19 100:13 129:8	specifications 57:6 62:20 64:16 spelled 132:4 spend 13:13,15 117:10 128:23 spends 119:24 spent 13:17 17:2,5, 8 117:13 STA 97:7,8 98:24 99:1,4 stand 18:2 stands 99:1 134:4 start 9:10 19:23 42:3 93:11 starting 76:9 90:25 112:5,8 starts 78:5 125:6 132:22 STAS 99:5 state 6:23 33:15 34:2 42:15 49:21 55:13 63:13 66:17 68:15 71:13 73:5 99:10,
signal 26:2 28:25 29:14 40:18, 20 52:24 96:3 99:20 100:23 101:11,20,25 102:1,5 107:3,6,11, 14,17,21,22, 24,25 108:11, 12,13,18,24 109:4 116:1, 5,11 118:18 123:9,13 127:13,15,18 129:11,20,21 130:10 131:5 138:19 139:17 140:3 142:3	simulation 110:17,23 111:5,9,13,16 135:6,24 137:15 144:8 simulations 109:22 110:3 simultaneous 123:22 single 22:9 31:4 70:17 79:10 104:15 135:7 sir 102:14 SISO 97:5 sitting 88:7 89:3 situation 41:21 46:20, 23 47:3 53:19 136:1 137:11, 12	sleeping 50:8 slow 137:8,15 143:16 smaller 28:16 software 111:4,8,9 solution 105:9 solve 95:7,10,14 96:12,17,25 99:24 104:19 105:5 solved 104:21		
signal-to-noise 38:10 138:20 signals 94:21 135:10 signature 16:9 signed 18:5,12 significance 86:15 87:1 92:2 110:13 139:3 similar 58:24 82:3 Similarly 56:7				

14,23 104:7 109:25 120:10,12,14, 15 122:8,9, 10,13,14,15, 25 123:1 128:1,3,4,5,7 129:19	19:25 20:8, 16,20,23 21:2,6,9 22:16 23:8 24:3 26:9 29:13 43:23 44:12,19 66:21 68:17, 23 69:4 71:8 72:25 73:2,3, 4,9,15,21,24 80:12,14,16, 19,21 81:9, 11,24,25 82:11,13,22 83:3,13,21 84:4,14,16, 19,20 85:7, 13,21,24 87:22,23 88:3,12,20 89:16 90:8,10 94:20,22 99:1,11 101:4,8,9,12, 14,18 102:1 106:5,9,11,13 107:25 128:16	stress 86:21 stringing 75:23 structured 85:5 study 132:8 study's 109:22 studying 133:8 submit 14:18 submitted 15:4,5,6 114:5 substance 8:9 succinct 86:25 92:13 suggest 104:9 suggesting 134:18 support 19:9 38:11 39:3 supportable 39:11 supporting 16:4 supports 65:8 sur-reply 14:9	swear 6:10 switch 97:7 106:24 107:4,15,21 108:1,4 129:22 switched 71:2 switches 99:11 108:18 switching 100:2 105:13 125:11 sworn 6:18 system 30:19 31:3,12 32:3 34:13 104:10 107:4, 15 110:1 111:3,10,21 117:13 118:2 119:2 121:4, 5,6 122:17,23 125:24 137:1, 6,20 138:1,5, 6,12 systems 113:1 T T-I-I-R-O-L-A 132:4 tab 19:12 71:2 94:3 132:2 table 7:21 8:19 9:3	takes 119:17 taking 9:7 10:10 34:9 64:18 80:16 136:12 141:9 talk 9:9 12:3 62:16 talked 12:7 37:15 80:1 talking 9:10 85:6 119:18,21 136:5,14 talks 50:19 56:19 taught 131:13 143:13 teach 108:13 teaches 99:10 107:25 108:12 109:7 teaching 110:18 135:16 technique 133:2 techniques 96:2 technologies 126:3 technology 11:10,16
stated 30:6,9,10 31:15 34:1 38:19 58:10 63:16,17 96:20 statement 32:4 52:5 60:20 73:1 88:5 89:16,20 90:9 91:11, 13,14 95:5 96:7 112:14 132:15 133:6 134:21 statements 40:7 43:19 states 31:1,16 37:17 61:14 71:24 73:23 95:24 99:4 105:5 115:25 118:1 120:9,18 122:8,23 123:1 125:24 129:10 139:10 stating 94:18 101:19 103:5 106:11 117:2 station	stations 19:25 20:13 98:25 105:14 112:17,21 step 42:2 stipulation 6:9 stop 41:10 stoplight 41:5			

125:18,20 telephone 98:25 99:2,6 telling 128:23 ten 39:25 109:14 ten-minute 109:12 tend 49:22 50:6 114:23 term 27:1 30:9 32:19 34:24 35:7,9,16 36:9 38:5 65:18 66:9 76:16 87:18 90:2 100:12 124:17,24 128:10,13 131:15 139:15 terminology 68:12 terms 17:16 27:4 34:15 35:21, 22 37:3 39:2 62:23 64:7, 21,22 69:9 132:23 testified 6:19 67:2 testimony 9:20 30:4 58:5 67:10 74:10 138:1	Texas 6:11 7:2 14:13 text 8:6 theoretical 135:12 thing 8:22 86:25 121:21 things 46:3 47:6 51:10 74:17 99:7 141:13 142:7 thinking 49:7 tied 100:14,21 Tirola 132:4,16 133:1,8,14 134:8,10,17 143:8 144:7 Tirola's 132:19 time 7:20 13:13,15 16:24 17:13, 14,16 33:7,9 34:10,13 37:23 74:3 100:11 109:11 117:10,13,19 118:15 119:24 120:12,17,21 121:1,13 124:19,22,25	128:10,14,17 129:7 144:17 145:8 times 8:14,15 21:25 58:9 65:10 117:24 118:23 121:12,22 122:22 124:17,21,24, 25 titled 102:18 113:15 114:6 today 7:3,7 8:6,10, 17,21 9:7,17, 20 10:11,18 11:4,14,19 12:4,11 19:8 39:9 67:2 88:7 89:3 145:3,5 today's 6:7 toggling 120:11 tomorrow 145:4 Ton 117:4,10,13, 19,24 118:15, 16,23 119:15, 24 120:4 121:12,22 122:3 124:17 top 60:12 88:1 117:7 123:3	124:11 134:25 135:2 137:7,8,21 total 13:19 17:5 103:7 104:1 121:8,17 traditional 133:4 traffic 94:23 trait 133:8 transceiver 21:13,15,16 22:25 23:1,3, 9 40:13 45:4, 5,10,16,17,23 46:5,9 47:1, 14 48:1,3,21, 25 49:2,7,9 52:19 58:20, 21 59:8 64:3 70:2 74:13,18 75:1,5,16 76:21,24,25 77:2,7,13,22, 23 78:8,9,11, 17,18 79:3,6, 9,13,17,19,23 91:8,10 92:24 103:18 117:10 118:15 119:17 123:5 127:19,23 129:9,19 transceivers 21:10 22:15, 21 40:8 50:2, 20,23 51:2	52:6,14,15 53:3,11,20 54:4 56:20,22 57:12,15,24 58:1 65:6,10, 16 transcribed 9:13,15 transcript 15:17 90:19 144:24 145:7 transistors 125:12 transition 67:3 119:10, 12 120:17,21 121:1,10 124:25 transmission 25:10,22 26:1,9,14,19, 21,25 27:3,4, 7,10,12,18, 24,25 28:4,6, 9,10,11,18,22 30:1,7,8,11 31:1,4,8,11 32:2 33:14,17 34:20 35:10 36:16 38:20 48:18 49:9 50:3,23 51:2, 8,23 52:6,8, 15 53:3,12,20 54:5,11,20 55:1 56:23,25 57:2,12,19,25 58:1,10 64:2 65:7,11,15,18 66:2,7,9,12, 13,14,15,19
---	---	---	---	--

67:7,13,18 68:2,9,11 74:13 75:2,6, 17,19,22 76:1,4,6,12, 13,20,22 77:2,8 103:6, 21,25 116:1, 23 117:2,3 118:3 119:15 122:6,18 127:21,23 133:25 134:12 136:9 139:12 141:20 transmission s 40:9 50:21 56:21 transmit 29:9,14 30:18 35:14 36:21 57:17 71:15, 16,18,23 72:4,10,12, 16,24 73:6 92:9,15,16, 17,20 93:4,5, 7 101:21,24 102:7 109:6 117:9 119:21 123:9,13 127:4 129:11, 14,20,22 130:10 131:5, 11,17 133:2, 21 transmits 21:6 121:5 transmitted 35:8 38:9	40:21 transmitter 22:1,7 23:4,5, 6 24:14,16,20 25:7 49:1 127:18 135:8 transmitters 21:23 106:14, 17 transmitting 20:24 21:4 33:8 34:10,11 44:22 70:2 73:6 82:1,5,7 85:22 86:12, 16,23 87:3 90:23 91:4,7, 18 92:1,3,18, 19,23 120:5 121:13 122:11,24 128:2,4 129:24,25 130:3,15,17 131:6,18 transmitting' 91:3 treated 119:16 trial 61:15 true 30:20 138:15 Tsp 117:4 124:21 Ttr 117:4 119:16 121:18 124:24	turn 16:7 20:6 30:14 31:20, 21 32:8 40:4, 22 41:11 50:2,23 51:2 52:6,14,19 53:3,11,20 54:4 56:22,25 57:1 58:7 60:8 65:6 87:17 90:20 106:1 109:8, 18 112:3 113:14 115:17 132:12 turned 53:2,22 54:11,25 57:20 58:20 67:13,14,18, 20 68:2,3 74:13,18 75:2,5,10 77:7 88:12,20 89:17 90:10 127:2 128:5 turning 51:7,22 52:8, 16 54:20 57:12,19,25 58:10 76:21 turns 41:7 118:3 122:5,18 127:20,23 tweaked 85:4 two-ray 135:18	TX 133:4 type 16:14 101:23 109:5 U U.S. 10:14,19 19:19 93:20 UE 133:21 134:1, 4,13 136:6,8 uh-huh 9:15 uh-uh 9:15 UL 134:1,13 136:16 ultimately 121:2 UMTS 132:3,9 unannotated 9:3 uncommon 57:5 115:12 understand 7:6 8:8 10:6, 8,11,18 11:5, 15 14:11 18:18 19:4 28:8,10 29:2 34:5 44:8 52:7 54:9 57:4,7,9,22, 24 58:7 61:3	64:10,13,15 65:21 66:11 75:25 76:18 77:5,19 78:16 83:8,16 86:4 88:8 93:23 96:14 104:5 130:23 134:17 135:15 136:19 139:5 142:22 understandin g 26:24 27:2,6, 11 33:24 36:2 38:22 42:4 45:9 57:15 73:11 89:5,22 90:1,4 91:15 104:12,24 understands 131:4 135:25 understood 64:10 unrelated 63:3 101:11, 23 unsolved 104:22 unsubstantiat ed 131:15 uplink 132:3,9 136:6 upload 139:13 upper 20:17 137:4, 18 138:4
---	---	---	---	---

user 32:18 33:7,9, 10,11,16 34:11 134:4 139:6	versus 38:23 133:9	18,25 69:11, 18,21,23 71:18 72:4, 10,12 73:6 74:14,19,21 75:3,11,17 77:10,22 78:8,11,14, 17,19 79:3,7, 12,15,19,23 80:15,17,22 81:1,12 82:1, 6,17,22 83:3, 10,21 84:1,5, 9,11,21 85:22,25 86:22 87:23 92:8,15,17,20 93:4,5,6 94:20 96:3 101:20,25 102:1,4,7 109:4,5 131:11,15,16	111:3 112:12, 17,21	worse 133:4 135:11, 22 136:23
users 136:7,24,25 138:7,14 139:8 143:1, 10	vertically 136:22		wondering 70:13	worst 142:5
VIDEOCONFERENCE 6:3	view 57:11 64:1,11 73:8		word 16:13,14 75:6,9,18 81:6 98:2,13 116:8,19 118:11,12	write 16:13 17:16
V	viewer 7:14		words 27:8 30:21 34:7 35:19,24 61:18 75:20 77:5 91:12 98:12 116:3, 18 117:17 123:16 128:19,20 130:14,20 134:3 136:11	writing 17:18
vacuum 22:13 105:1 110:23 135:9, 13	W			written 37:6
vague 18:8,16 19:3 39:15 46:23 51:21 56:14 59:4	wait 88:22			wrong 10:21 73:18 78:3 120:23
Valenti 115:4 143:25	waiting 40:8,12,14, 17,20 41:6, 11,12 42:1,9, 11 43:3,5,7, 11,24 44:13, 22 45:4,11, 14,16,18 46:1,4,5,8,20 47:3,8,9,12 48:1,18 49:3, 5 50:21 51:6, 16,18,24 52:2,10,23 53:8,10,14,15 54:1,4,7,10, 25 55:2 56:20 57:11,17 58:18 59:14 60:15,16,22 61:1 62:3,9, 13 63:1,12 64:23 65:23 66:24 68:6,7,	walking 137:8,15 143:16		wrote 12:18 16:3,11 86:1 87:16
valid 78:24		wanted 104:5	wordy 86:24	X
validity 14:19 18:4, 13,20,24 19:1,2,5 110:6 111:7		wasted 117:15	work 16:22 17:13, 20 123:10,14 129:11,19,21, 22 130:10	x-axis 136:23
variable 32:23 33:6, 12,22 34:6 121:20		ways 139:22,24 140:1,5	working 40:25 41:3, 21,22 123:17 129:16 130:3, 7,18,25 131:10	Y
varies 121:22		WEDNESDAY 6:1	works 38:1 123:5 129:10	y-axis 136:21
verb 37:21		weekend 13:17	worry 48:12	yes/no 9:14
		wireless 95:25 97:6 98:23 102:19		yesterday 11:24 13:8,18
				Z
				Zoom 6:3 8:16