UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,	)	
	)	
Petitioner,	)	
	)	
vs.	)	Case No.
	)	IPR2024-00432
ENTROPIC COMMUNICATIONS, LLC,	)	IPR2024-00435
	)	IPR2024-00438
Patent Owner.	)	
_____	)	

REMOTE DEPOSITION OF

DAVID B. LETT, VOLUME I

DECEMBER 10, 2024

Reported by:
Brooke Silvas, CSR 10988
Job No. 1238320

UNITED STATES PATENT AND TRADEMARK OFFICE
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) IPR2024-00432
ENTROPIC COMMUNICATIONS, LLC,) IPR2024-00435
) IPR2024-00438
Patent Owner.)
_____)

Deposition of DAVID B. LETT, taken remotely via Zoom, commencing at 8:02 a.m., on Tuesday, December 10, 2024, before Brooke Silvas, Certified Shorthand Reporter No. 10988.

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(All appearances are via videoconference.)

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I N D E X

WITNESS: DAVID B. LETT
EXAMINATION BY PAGE
ATTORNEY HENDIFAR 5

E X H I B I T S
(None)

INSTRUCTION NOT TO ANSWER
(None)

INFORMATION TO BE SUPPLIED
(None)

REMOTE DEPOSITION; TUESDAY, DECEMBER 10, 2024
8:03 A.M.

DAVID B. LETT,
having been duly administered an
oath remotely by the reporter, was examined
and testified as follows:

EXAMINATION
BY ATTORNEY HENDIFAR:
Q Good morning, Mr. Lett.
A Good morning.
Q Thank you for your time.
A Good morning.
I'm hearing an echo. Is there something that I should be doing different?
ATTORNEY QUALEY: You might need to mute yourself.
ATTORNEY CUVIELLO: Yes. One second.
THE WITNESS: Okay. Go ahead. Sorry.
BY ATTORNEY HENDIFAR:
Q Of course. Would you please spell your full name for the record.
A David Lett.
Q And do you understand that you're

1 testifying under oath today?
2 A I do.
3 Q Have you been deposed before in an IPR
4 proceeding?
5 A Yes.
6 Q Approximately how many times?
7 A It is hard to say. Maybe -- I'm guessing
8 about five maybe. Something like that.
9 Q Okay. Do you have any questions about
10 the procedures for the deposition in an IPR
11 proceeding?
12 A I don't think so.
13 Q During the breaks, you're not permitted
14 to speak with your attorney about anything
15 regarding the substance of this deposition, other
16 than issues related to privilege. Do you
17 understand that?
18 A I do understand that, yes.
19 Q Okay. And your counsel will be making
20 from time to time short two-word objections, such
21 as objection as to form. But they will not be
22 allowed to make speaking objections. So if you
23 have any specific ambiguity about a question, if
24 you need additional information, if you do not
25 understand a particular word, it is up to you to

1 tell me which part of the question you may need
2 clarification, and I would be happy to rephrase
3 the question.
4 Do you understand that?
5 A Yes, I understand.
6 Q Okay. And do you have any documents in
7 front of you?
8 A I do.
9 Q Okay. Would you please let me know what
10 documents you have?
11 A So I have a thumb drive with the folder
12 that has all of the, I think, materials
13 considered. There's -- and I only have the thumb
14 drive open and the Zoom. And so I can access,
15 like, exhibits, whatever they're numbered,
16 1000-something down to the end. Right. And I
17 also have paper copies of some of the same
18 documents. I have a notebook that's got some of
19 the -- some of the materials considered in a
20 printout. And I also have a printout of my
21 sections of my declarations that are the claim
22 appendices sections separately. It is the exact
23 same thing that is in my declaration. And then
24 similarly, I have separate printouts of the
25 materials considered sections of my declaration.

1 And, again, those just help me kind of find where
2 we are and what we're talking about.
3 And farther over, which I can barely
4 reach here, okay, I have some -- I think some
5 printouts of the three patents that are of
6 reference here. And then further down -- down
7 here, I've got printouts of my three declarations.
8 And I think that's about it.
9 Q Thank you very much. Are all the copies
10 of -- let me start fresh.
11 Do you have any documents that -- that
12 have not been filed -- strike that.
13 Do you have access in front of you,
14 either physical copy or electronic copy, of any
15 document that has not been filed in any of the
16 three IPRs subject to this deposition?
17 A I don't know exactly how to answer that
18 question. I think I don't quite understand how to
19 answer that question. But what I have is I have
20 this thumb drive that has three folders. One is
21 about the IPR related to the '362. Another folder
22 for the '866. And another folder for the '206.
23 And if I open up, for example, the '362 folder,
24 I'll see it starts with EX-1001. And it goes in
25 sequence, 102, -03, -04. There is probably some

1 skipped numbers. And I think it is
2 representative. It goes up to EX-1076. So I
3 think these are all the exhibits that were in the
4 materials considered section. And similarly, the
5 '866 folder and the '206 folder have the very
6 similar kind of documents. They're all labeled EX
7 with a number, starting with 1000 something. Does
8 that answer your question?
9 Q It does.
10 Do any of the documents that you have in
11 front of you have markings or are they clean
12 copies?
13 A I don't have any markings on any
14 documents. They're all clean.
15 Q Okay. Other than contained portions of
16 your declarations and specific paragraphs, do you
17 have any other notes that have been prepared by
18 you or other people?
19 A No, I do not.
20 Q Other than being retained as an expert in
21 this IPRs, do you have any current or past
22 association with Comcast Cable Communication?
23 A When I worked at Scientific Atlanta and
24 Cisco -- Cisco purchased Scientific Atlanta, so I
25 use them interchangeably sometimes -- Comcast was

one of my customers.
Q And I do not want any business confidential information of Scientific Atlanta or Cisco. To the extent that you are allowed to disclose that information, what do you mean by Comcast being a customer? What kind of products did Comcast obtain from you?
A At Scientific Atlanta and Cisco, we sold equipment and services for, among other things, cable television, services and networks. And so, for example, set-top boxes that my group was responsible for developing, those were sold to Comcast as one of our customers. And also cable modems were sold to Comcast. So, you know, I was a VP of engineering. And so sometimes, you know, I would have interactions with Comcast. Kind of a lot of different things. But mostly related to like when we're going -- when we're selling them a product, helping them to qualify and test that product, among other things.
Q Thank you.
And when was the last time when Comcast, in terms of -- what year was the last year when Comcast was a customer at a company where you worked?

A So I left Cisco in 2011. Is my -- let's see. Let me just double-check that in my declaration. I think that's right. Yes. So when I left Cisco in 2011, that was the last time that I can recall Comcast being a customer, as I described.
Q Thank you very much.
How much are you being compensated per hour for your work on these IPRs?
A I have an hourly rate of $385.
Q And is that what you're being compensated for the IPRs?
A Yes.
Q What did you do to prepare for today's deposition?
A I studied the documents and I guess you could say the materials considered as we -- as I described in the folders. And I also had some preparation sessions with my attorneys.
Q Okay. And how many hours of preparation sessions did you have with your attorneys?
A It's hard to say. Maybe -- just ballpark, I'm thinking maybe -- maybe 15 hours.
Q And how many hours did you spend on your own preparing for today's deposition?

A I don't recall. Over the last couple weeks, I've spent some time studying these documents. I just -- I don't know. I'm sorry.
Q Not a problem.
Other than the documents that are in the folder in front of you that you reviewed, did you review any other documents in preparation for today's deposition?
A No.
Q Okay. When were you first contacted about any of the three IPRs that are the subject of this deposition?
A I think it was the fall of 2023.
Q Do you recall who contacted you?
A I can speculate. Would you like me to?
Q So let's discuss the difference between a speculation and an estimate.
A Okay.
Q And I'm sorry, I assumed you are familiar, but let me just make sure that we have laid the ground work.
If I ask you what is the length of the conference room table in this conference room where I'm located, you're not located here. You cannot see it. So you -- all you can do is to

speculate. I do not want that. But if I ask you what is the length of the conference room -- room table in the conference room where you're located, you may not have a ruler to precisely measure the length of that table. But based on your training, you are able to look at that table and provide a reasonable estimate. I am entitled to that reasonable estimate.
Do you understand the difference between speculation and estimate?
A I understood what you just said, yes.
Q So the question was --
Madam Court Reporter, would you mind reading back the question. I lost track of that question.
(The record was read back as requested.)
"Q Do you recall who contacted you?"
BY ATTORNEY HENDIFAR:
Q Okay. Do you recall who contacted you at the initiation of your retainment for these cases?
A I would say no, I do not recall.
Q Okay. Do -- you submitted a declaration in connection with each of the three IPRs for which you are being deposed today; correct?

A I'm sorry. I didn't quite understand the first few words of what you said.
Q Sure. You submitted a declaration in connection with each of the three IPRs for which you are being deposed today; correct?
A That's right.
Q Okay. And when I refer to your declarations, I'm referring to the collective of those three declarations, unless we specify a specific one. Is that fair? Do you understand that?
A I mean, I understand what you just said, yes.
Q Do your declarations contain all of your opinions that you had at the time of signing the declarations, in connection with the matters at issue here?
A I think it's complete. You know, if there's something I'm missing, you know, I'll be happy to answer about it. It is hard to say if I have -- if I put down a hundred percent of my opinions on these papers. That was the intention, right. But it's possible I could have missed something.
Q Have any of your opinions with respect to

any issues addressed in your declarations changed?
A I'm sorry. I didn't quite understand a couple words you said. Would you say it again, please?
Q Of course.
Have any of your opinions with respect to any issues addressed in your declarations changed?
A No. I stand behind my declarations as written.
Q Did you draft your declarations?
A It was a collaborative effort between myself and the attorneys.
Q Did you prepare the first draft of your declarations?
A Sections of it, I did. Some of the sections were drafted by the attorneys.
Q Now, one of the references relied upon in your declarations is a reference named Zhang. Do you recognize that reference?
A Yes.
Q Did you find the Zhang reference relied upon in your declarations?
A I used Zhang for rendering my opinion in these declarations, yes.
Q Thank you. Maybe my question was not

clear. I apologize.
Did you find the Zhang reference relied upon in your declarations?
A You mean did I discover this prior art? Oh, I think the attorneys provided this as an example of the prior art.
Q Did you have familiarity with the Zhang -- let me strike that.
Were you aware of the Zhang reference prior to your work on your declarations here?
A Not that I recall. I mean, I may have passed -- I may have seen it at some point, but I do not recall.
Q Okay. The first named inventor on Zhang is Weimin Zhang. And that is exhibit -- I believe it is 1013, the first IPR '432.
Other than having seen his name on the Zhang reference, do you have any familiarity with a Mr. Weimin Zhang? And that's W-e-i-m-i-n Z-h-a-n-g.
A I don't think so. I mean, from my industry experience, I've had interactions and discussions with BroadLogic. And so I may have met him somewhere along the way, but I don't recall any -- any knowledge about him.

Q Same question for the second named inventor on Zhang, a Mr. Tim Misko. Other than him being refer with the Zhang reference, do you have any familiarity with Tim Misko?
A Not that I'm aware of, except for maybe crossing paths at some point with his employer, which may have been BroadLogic, according to this assignee section of the patent.
Q Same question about Mr. Jeremy Woodburn.
A Yeah. I think I have the same answer. I haven't -- that I'm aware of -- I'm not aware of him or know him. I may have crossed paths somewhere along the way in the industry.
Q Now, you mentioned that you had done some work with BroadLogic. Did I understand you correctly?
A Yes. I've talked with BroadLogic before.
Q And is that the same BroadLogic that the assignee of the Zhang patent referenced?
A I don't know.
Q Would you elaborate on the context when you had interactions with BroadLogic?
A I don't remember. Except I remember the name BroadLogic. And I know I had some interactions with them. But I cannot remember

what it was about. I mean, we had lots of vendors and companies that we collaborated with on all kinds of projects. So I just can't recall.
Q Okay. Do you know the line of business where BroadLogic worked?
A I would say no, I do not.
Q Okay. Do you have any familiarity with a real-world system that implemented the system described in the Zhang reference?
A It's hard to say. I mean, these are quite common disclosures and were well known at the time of a POSITA.
Q Did you search to find any prior art references in connection with preparing your declarations?
A I just looked at the ones that were in the materials considered.
Q Now, do you have any familiarity with a Mr. Sam Ross?
A Yes.
Q Would you please explain what the context of your familiarity with Mr. Ross is?
A He worked for me at -- and I can't remember if it was Scientific Atlanta or Cisco because, again, I use those interchangeably

because Cisco bought Scientific Atlanta. He was in my organization and reported to me.
Q And what year was that?
A Gosh. I was there from -- the second time, from 2000 -- excuse me -- from 1990 to 2011. So it was during that time. But I can't recall what years, you know, Sam worked for me.
Q And did Mr. Sam Ross directly report to you when he was working for you?
A Yes.
Q And what were his responsibilities?
A One of his responsibilities was I put him in charge of a development group, leading a few engineers in the development of products.
Q So did Mr. Sam Ross supervise a group of engineers?
A He did.
Q Roughly how many engineers did Mr. Sam Ross -- Sam Ross supervise?
A I'm thinking around -- let's call it five to ten.
Q And what was your position at the company when you supervised Mr. Sam Ross?
A I was vice president of engineering.
Q And do you recall what product Mr. Sam

Ross was put in charge of developing?
A I don't remember.
Q Okay. And did you consider Mr. Sam Ross to be an intelligent engineer?
A Yes.
Q And did you consider him to be knowledgeable about the field of RF signal processing that he was working on?
A Sam was more of a digital person as opposed to an RF person, is my recollection.
Q What is the difference?
A Well, specialty in let's call it ones and zeros. Digital signals. Right. And -- as opposed to RF processing of signals.
Q Okay. So a tuner may have both an RF front and a digital front end; correct?
A Well, you know, there are many generations of tuners, let's call it. Right. So you know in the very early days, many of the components were analog or RF. You know, as the progression of technology advanced so that some of these functions could be implemented digitally, right, some of the processing in products was done with digital circuits and digital signal processing techniques.

Q Okay. So within a tuner that may have both a radio front end and a digital front end, is the specialty different for one versus the other?
Let me rephrase the question.
Is there a subspecialty for the digital front end as opposed to the radio front within a tuner?
A Well, so are you referring to like the definition of a digital front end or a radio front end? Could you give me examples of what -- what you're talking about so I can answer more specifically?
Q Sure. No, I'm not really going into the definitions. You mentioned that Mr. Sam Ross was more of a digital person. And I am trying to get an understanding of was there a digital subspecialty versus a radio subspecialty in this field? So that's the context that I'm asking the question.
A So, for example, you know, individual engineers that worked in my organization, right, they had certain specialties, right. Some were, you know, RF engineers that, you know, dealt a lot with RF kind of tests and designs and circuits and -- and processes. And then there were digital

1 people that, you know, kind of after the signals
2 were turned into ones and zeros were more expert
3 in providing, you know, design details and -- and
4 processes and -- and algorithms and so on for
5 processing signals digitally. Right. So it is
6 kind of a common thing in the industry, you know,
7 when you -- when you have an engineer, you know,
8 he is an RF guy or she is a digital engineer.
9 And, you know -- you know, it is kind of a common
10 understanding.
11 Q Okay. And I apologize. Some of these
12 questions may seem basic. My background obviously
13 is not in this field. So I appreciate your
14 patience. As we go through, a lot of my questions
15 may seem really basic. But I appreciate your
16 patience and explanation.
17 Would you consider yourself an RF person
18 or a digital signal person?
19 A I mean, I don't know what to call myself
20 anymore. So I managed the entire products, right.
21 It included hardware, software, digital, RF, even
22 systems. So it's hard to answer that question.
23 Q Okay. Do you --
24 A I think I have a very broad background, I
25 should say.

1 Q Do you consider Mr. Sam Ross to be an
2 expert relating to wideband receiver systems?
3 A I don't remember him working on that, no.
4 Q What was Mr. Sam Ross specifically
5 working on in the 1990s, when he was working for
6 you?
7 A I remember he was -- one project he was
8 working on was looking at the reliability of hard
9 disk drives as part of the DVR and how to enhance
10 the design so as to increase reliability. That's
11 one project that I remember.
12 Q Okay. Any other projects?
13 A I'm sure there were some, but I -- that's
14 the one that came to mind. I don't recall any
15 others right now.
16 Q But there were other projects that you do
17 not recall; correct?
18 A I think so, yes. That's fair to say.
19 Q At either Scientific Atlanta or Cisco,
20 did you work on wideband receiver systems?
21 A I have trouble remembering if I developed
22 a product -- if my group developed a product at
23 that time using a wideband tuner. We may have. I
24 just cannot remember.
25 Q Have you ever worked on developing a

1 wideband receiver product?
2 A I think I have, but I cannot recall the
3 details.
4 Q Do you recall the time frame?
5 A No.
6 Q Do you recall the company where you might
7 have performed that work?
8 A Well, I worked on -- with two companies
9 that were kind of in that general area of
10 technology. Scientific Atlanta and Cisco, you
11 know, again, I use them interchangeably. And
12 EchoStar, which is another one that used that type
13 of technology.
14 Q But you don't have a specific
15 recollection of having worked on developing a
16 wideband receiver at any point; correct?
17 A I do not remember the details about
18 working on that, no.
19 Q Are you familiar with a company called
20 MaxLinear?
21 A I mean, I've used them as a vendor for
22 parts that we put in design. So in that regard,
23 yes.
24 Q Is that when you were at Scientific
25 Atlanta and Cisco?

1 A I cannot recall.
2 Q What types of products did you obtain
3 from MaxLinear?
4 A I don't remember.
5 Q So I'm now going to ask you about your
6 degree of familiarity, if any, with any of the
7 named inventors of the three patents at issue
8 here. Do you have any familiarity with the first
9 named inventor of the '362 patent, Mr. or
10 Ms. Madhukar Reddy. And that spells M-, as in
11 Mike, -a-d-, as in David, -h-u-k-a-r.
12 A No. I may have crossed paths with him,
13 but I don't think I know him.
14 Q Second question -- I'm sorry. Same
15 question regarding the second named inventor,
16 Curtis Ling?
17 A I can tell you all three of them I have
18 the same answer, if you want to speed things up.
19 Q Yes.
20 A Okay. Now, you have submitted a CV as
21 Exhibit 1003. And on page 3 of your CV -- just
22 let me know when you have it so I can ask my
23 questions.
24 A Okay. I have it.
25 Q Okay. Now, on the second page, where it

1 says you worked from August 1990 to July 2011,
2 Vice President of Engineering, Cisco, slash,
3 Scientific Atlanta, do you see that?
4 A Yes.
5 Q Second bullet point, last cause -- last
6 clause, it says full spectrum tuners. Do you see
7 that?
8 A Yes.
9 Q What is a full spectrum tuner?
10 A So a POSITA would understand a full
11 spectrum tuner to be a tuner that processes the
12 receiving signal from the lowest frequency in a --
13 in a system up to the -- up to the highest
14 frequency in the system.
15 Q And what is the counterpart for a full
16 spectrum tuner? Partial spectrum tuner?
17 A I don't know. Maybe.
18 Q Is there a term of art that is used as a
19 counterpart to a full spectrum tuner?
20 A So in relationship to all of these
21 patents, we've been talking about wideband tuners.
22 Is that what you mean?
23 Q No. No. I pointed you to what I meant.
24 So your CV talks about full spectrum tuners. And
25 I'm trying to understand -- let me rephrase my

1 question.
2 How did full spectrum tuners that you
3 worked on differ from non-full spectrum tuners?
4 A So -- for example, a single channel tuner
5 would -- would, let's say, process a single
6 television channel, for example, like 6 megahertz
7 wide bandwidth. Whereas a full spectrum tuner
8 would be much wider bandwidth at that and -- and
9 comprise more than one, let's call it, television
10 channel of 6 megahertz. Again, the 6 megahertz
11 depends on where you are, right, in the world.
12 The point is, it is more than one channel
13 bandwidth.
14 Q And why would you develop a full spectrum
15 tuner as opposed to the conventional, for lack of
16 a better term, non-full spectrum tuner?
17 A Did I opine on that in my declaration?
18 If I did, maybe you could point me to it, and I
19 can answer questions about it.
20 Q I am not aware of where you may have
21 opined on it in your declaration, but it is in
22 your CV, which we're entitled to ask about your
23 expertise and your experience.
24 So the question is, on page 2 of your CV,
25 you mention your work on full spectrum tuners.

1 And my question was, what prompted the work on
2 full spectrum tuners as opposed to non-full
3 spectrum tuners?
4 A Well, I think I answered that question.
5 The -- the full spectrum tuners would process more
6 than one channel bandwidth.
7 Q And what would be a typical use case
8 scenario for a full spectrum tuner?
9 A In a cable television environment, like
10 in a set-top box, one might want to be able to
11 watch and record multiple channels. And so it
12 might be good to save cost by an integrated
13 solution that would be more cost-effective than
14 having multiple single channel tuners. Again, it
15 depends -- as far as the cost, it depends on a lot
16 of factors, right. So the state of silicon
17 technology, you know, the maturity and the price
18 point of that, as well as the technical
19 limitations of that silicon at that particular
20 time. So it kind of depends on a particular point
21 in time, whether it makes sense from a cost
22 perspective or not.
23 Q Thank you. Now, if the function of the
24 full spectrum tuner is to process more than one
25 channel, why does it need the full spectrum as

1 opposed to just a portion of the spectrum with
2 multiple channels?
3 A Well, so I was talking about a tuner that
4 processes more than one channel. Right. And more
5 than one would include two. And as the '362
6 patent, for example, describes a wideband tuner is
7 more than one channel. So that's a wideband
8 tuner. And if you said let me process all of the
9 channels that are being received in the cable
10 system in a way so that we could use ADT -- A-to-D
11 converters to digitize that entire spectrum as the
12 first -- well, not the first step. But as part of
13 the first steps of the tuner, then you could --
14 you could do that with even more than two
15 channels, right. So -- so if I had a system, for
16 example, that had let's call it 54 to
17 750 megahertz of channels that are being received
18 at the set-top box, one might consider a full
19 spectrum tuner that would essentially digitize the
20 spectrum from 54 to 750 megahertz.
21 Q And the full spectrum tuner would
22 digitize that entire frequency bandwidth, even if
23 all it needs is two or three channels in that
24 bandwidth?
25 A I'm sorry. I - you cut out just a

MAGNA LEGAL SERVICES

1 second. Could you say that again?
2 Q Of course. So the full spectrum tuner
3 would digitize that entire bandwidth from roughly
4 50 to 750 megahertz, even if all it needs is two
5 or three channels in that bandwidth?
6 A I'm having trouble understanding. I
7 think it is your accent. I'm sorry.
8 Q I will repeat the question.
9 A Okay.
10 Q The full spectrum tuner would digitize
11 that entire bandwidth from roughly 50 to roughly
12 750 megahertz that you mentioned, even if all it
13 needs is two or three channels in that bandwidth?
14 A Well, so there are many different ways to
15 implement designs, right. You could -- you could
16 do whatever you wanted, right. So if we're
17 talking about a hypothetical design, you know,
18 maybe I can answer. I'm -- I didn't really want
19 to design a system for you right here. I was
20 hoping I could testify and answer questions about
21 my declaration.
22 Q Now, when did you start working on full
23 spectrum tuners at Cisco, slash, Scientific
24 Atlanta, as you state in your CV?
25 A I don't remember.

1 Q Do you recall the specific products you
2 worked on developing as a full spectrum tuner?
3 A No.
4 Q Do you recall when Cisco or Scientific
5 Atlanta first provided to the market full spectrum
6 tuners?
7 A I mean, Cisco and Scientific Atlanta
8 provided set-top boxes and cable modems. We
9 didn't sell tuners.
10 Q Now, what is a tuner? And if you're
11 looking at documents, I don't mind as long as you
12 just state for the record what you're reviewing,
13 please.
14 A I'm looking at my declaration, the '362
15 declaration. So as I say in my declaration, in
16 paragraph 60 of the '362 declaration, consumer
17 terminal equipment included a radio receiver (also
18 known as a tuner) that received the RF signals and
19 processed them in such a way that a demodulator
20 could demodulate the RF signals.
21 Q How is a tuner different from a receiver?
22 A Well, as I just stated, the radio
23 receiver was also known as a tuner.
24 Q So is it fair to say that in the field a
25 radio receiver and a tuner were used

1 interchangeably?
2 A Sometimes, yes. I think that would be
3 fair.
4 Q But not always?
5 A It's hard to say.
6 Q But in your opinion, a tuner and a
7 receiver mean the same thing?
8 A Well, a radio receiver is what I said
9 here, is known as -- also known as a tuner.
10 Q Let me rephrase my question.
11 So in your opinion, a radio receiver and
12 a tuner are the same thing?
13 A In the context of these patents, yes.
14 Q Okay. How about the context of receivers
15 generally, the field of wideband receivers?
16 A What's the question?
17 Q Sure. In the field of RF radio
18 processing, are receivers -- strike that.
19 The question is, in the field of RF
20 signal processing, are tuners and radio receivers
21 the same thing?
22 A It's hard to say unless we're talking in
23 a specific context like -- like we were zeroed in
24 on, you know, the -- the -- how those terms were
25 used as related to technologies related to the

1 patents.
2 Q So in your opinion, there is no general
3 understanding in this field by a POSITA as to
4 whether a tuner and radio receiver mean the same
5 thing?
6 A I would say some would probably use it
7 interchangeably. Some may not. So I don't know.
8 Q What is the context where a tuner and a
9 radio receiver would mean different things?
10 A Well, so the context of these patents are
11 related to processing television signals, right.
12 And that's essentially where I focused my
13 opinions. So I didn't really think about or
14 opine, I don't think, on other applications of
15 tuners or radio receivers.
16 Q What is a demodulator?
17 A So as I say in paragraph 60, in the last
18 few lines, the demodulator recovers the digital
19 data encoded in the RF signals. And, again, this
20 is in the context of the patents that we're --
21 we're talking about.
22 Q Does a demodulator necessarily operate on
23 a baseband signal?
24 A I'm not sure that is necessary. That's
25 what is generally described in my declaration

1 though.
2 Q Can you think of an example where a
3 demodulator recovers data not from a baseband
4 signal?
5 A I haven't thought about that. That
6 sounds like a new opinion that I don't think I
7 rendered. And I would be happy to consider that
8 at another time. But I haven't thought about
9 that.
10 Q Do you know what a baseband signal is?
11 A Sure.
12 Q What is a baseband signal?
13 A So in the context of the patent, the
14 baseband is the lowest frequency starts at zero or
15 near zero and goes up from there.
16 Q So a baseband signal is any signal at
17 zero frequency? Is that your opinion?
18 A So in the context of the patent, a
19 baseband frequency is -- you know, starts around
20 zero and goes up from there. But it doesn't have
21 to be, right. That's just kind of a general
22 understanding, I would say.
23 Q Thank you. My question was not about
24 baseband frequency. The question was, do you know
25 what the baseband signal is?

1 A I'm sorry. I think I answered that.
2 Maybe I don't understand the question.
3 Q Sure. Have you heard of the phrase
4 baseband signal?
5 A Sure.
6 Q Is baseband signal a term of art that a
7 POSITA would know the meaning?
8 A Well, in the context of the patent, I
9 think it is as I described.
10 Q Again, if you would please answer my
11 question. I understand it is very normal for
12 experts to prepare to confine the answers to
13 exactly what is in the declaration. But we are
14 entitled to ask you about the background, what a
15 POSITA would understand, what is a term of art.
16 So if you would please focus on the question I'm
17 asking.
18 The question is, is a baseband signal a
19 term of art that a POSITA would understand its
20 meaning?
21 A So the POSITA, as defined in my
22 declaration, that works in the field, as defined
23 by the POSITA, and in the context of the patents
24 would understand what baseband signal means.
25 Q Okay. Is it your opinion that without

1 the discussion in the patent's specification, the
2 POSITA would not understand what the baseband
3 signal is?
4 A So are we using a different definition of
5 the POSITA than what is in my declaration?
6 Q No. That was not my question. The
7 question was, is it your opinion that without the
8 explanations provided in the patent specification,
9 the POSITA would not understand what the baseband
10 signal means?
11 A I'm sorry. I have not considered that.
12 I was considering the patent in rendering this
13 opinion. So it sounds like that might be
14 something that I haven't thought about. And I
15 really am not comfortable on the fly just
16 answering that.
17 Q So sitting here now, you do not have an
18 opinion on if a POSITA would generally know what a
19 baseband signal is; correct?
20 ATTORNEY QUALEY: Objection to form.
21 THE WITNESS: I think I answered that
22 question. So the POSITA, as defined in the
23 declaration, would generally understand in context
24 of the patent what baseband signal means.
25

1 BY ATTORNEY HENDIFAR:
2 Q Again, you're changing my question and
3 answering a different question. I understand that
4 you're instructed to add "in the context of the
5 patent" to every one of your answers. And that's
6 fine. But when my question is about a general
7 proposition, I would appreciate it if you would
8 actually answer my question. So I will repeat the
9 question.
10 The question is, is it your opinion that
11 a POSITA would generally not know what a baseband
12 signal is?
13 ATTORNEY QUALEY: Objection to form.
14 THE WITNESS: Would you mind reading back
15 the question?
16 BY ATTORNEY HENDIFAR:
17 Q I can repeat the question. It's not a
18 problem.
19 Is it your opinion that in this field, a
20 POSITA would generally not know what a baseband
21 signal is?
22 ATTORNEY QUALEY: Same objection.
23 THE WITNESS: I think I have answered
24 that in multiple ways. I'm not sure that I can
25 add anything to my previous answers that would be

1 different.
2 BY ATTORNEY HENDIFAR:
3 Q So your previous answers is always -- is
4 only that a POSITA would know what a baseband
5 signal is in the context of these patents. And we
6 can go back and read from the record. That is all
7 that you have said. My question is not limited to
8 the context of the patents. Do you understand
9 what I'm asking?
10 A Well, so I didn't prepare or think about
11 that and outside of the context of what we're
12 talking about here. I mean, it is possible
13 that -- that in other fields and other contexts
14 and other technologies, baseband signal might mean
15 something different. But -- but I really am
16 trying to answer your question in that -- you
17 know, as I define the POSITA. You know, have a
18 degree in electrical engineering or similar
19 discipline, along with three to four years of
20 experience in digital signal processing and
21 radiofrequency tuning systems for satellite and/or
22 cable communications. And -- and he would be
23 familiar with the kind of technologies that are in
24 the '362 patent and the other two patents. He
25 would certainly understand what a baseband signal

1 is.
2 Q And what would the POSITA's understanding
3 be of what a baseband -- not a baseband frequency,
4 but what a baseband signal is?
5 A Well, I think I answered that. So a
6 signal where the frequency component -- the lowest
7 frequency component is at or near zero hertz.
8 Q So it is your opinion that in the context
9 of the patents here, any signal where the lowest
10 frequency component is zero is a baseband signal?
11 A Perhaps you could give me an example and
12 ask me about it, and I can ask -- ask a
13 specific -- answer a specific question.
14 Q That is a specific question. I asked you
15 what a baseband signal is from the POSITA's
16 perspective. And you testified it is a signal
17 where the lowest frequency component is zero. So
18 my follow-up question is, is it your opinion
19 therefore that in the context of the patents, any
20 signal where the lowest frequency component is
21 zero is a baseband signal?
22 ATTORNEY QUALEY: Objection to form.
23 THE WITNESS: I'm not sure that's what I
24 said.
25

1 BY ATTORNEY HENDIFAR:
2 Q Which part of it do you disagree with
3 about what I just said?
4 A I think I said that the lowest frequency
5 is at or near zero. I didn't say it had to be
6 zero.
7 Q Thank you for the clarification. Let me
8 rephrase my question.
9 Is it therefore your opinion that in the
10 context of the patents, any signal where the
11 lowest frequency component is at or near zero is a
12 baseband signal?
13 ATTORNEY QUALEY: Objection to form.
14 THE WITNESS: Can you restate the
15 question, please?
16 BY ATTORNEY HENDIFAR:
17 Q Of course. Is it your opinion that in
18 the context of the patents, any signal where the
19 lowest frequency component is at or near zero is a
20 baseband signal?
21 A So if I had a box and I said -- and the
22 box is labeled baseband signal, right, and I had a
23 signal as described in the '362 patent as baseband
24 signal, one thing that would certainly be in that
25 box -- and there may be a lot of other things in

1 that box -- would be a signal where the lowest
2 frequency component is at or near zero and the
3 highest -- higher frequency is above that.
4 Q Thank you. So there are other
5 requirements for a signal to be a baseband signal
6 other than the lowest frequency component being at
7 or near zero; correct?
8 A I don't know. I haven't thought about
9 that. That sounds like a new opinion that I have
10 not rendered. What I'm trying to describe is in
11 my box, it is labeled baseband signal. What would
12 definitely be in the box -- and there may be other
13 things in the box, but -- but I haven't really
14 thought about what else can be in there, a
15 comprehensive list.
16 Q Okay. If you are presented with a signal
17 where the lowest frequency component is at or near
18 zero, what other information do you need to
19 determine whether that's a baseband signal?
20 A I don't think I rendered an opinion on
21 that, so I haven't thought about that.
22 ATTORNEY HENDIFAR: We've been going for
23 an hour. Is it a good time for a break?
24 THE WITNESS: Sure. We can do that.
25 ATTORNEY HENDIFAR: And I apologize, I

1 didn't mention at the beginning, if you also need
2 breaks at earlier intervals at any point, please
3 feel free to let me know. My intention is not to
4 torture you or impose. The idea is for you to be
5 as comfortable and as ready as you are so that we
6 can get the best and most accurate responses.
7 So let's take a ten-minute break and come
8 back at 15 minutes after the hour. Is that okay?
9 THE WITNESS: Okay. Thank you.
10 ATTORNEY HENDIFAR: Thank you.
11 (A recess was taken.)
12 BY ATTORNEY HENDIFAR:
13 Q Mr. Lett, during the break, did you speak
14 with anybody regarding the substance of your
15 deposition today?
16 A No.
17 Q Okay. Do you recall that we discussed
18 your work at Cisco regarding full spectrum tuners?
19 A Yes.
20 Q Do you recall how many channels the full
21 spectrum tuners that you worked on processed?
22 A I don't remember.
23 Q What is a mixer in the field of RF signal
24 processing?
25 A So if you look at paragraph 66 of my '362

1 declaration, just under EX 1018, Figure 2, the
2 term "mixer" and "multiplier" are often used
3 interchangeably to refer to an analog or digital
4 electric circuit -- represented by the X symbol
5 with the circle around it -- that multiplies a
6 modulated input signal, an RF signal, at a
7 frequency f1 and a reference signal that is from a
8 local oscillator, LO, at frequency f2, which
9 produces new signals at the sum and difference of
10 the input frequencies, f1 plus f2 and f1 minus f2.
11 This is illustrated in Figure 8-9 from Exhibit
12 1039.
13 Q Okay. And in RF digital processing
14 circuits, what is a mixer typically used for?
15 A Multiplying a modulated input signal, an
16 RF signal at frequency f1 and a reference signal
17 from a local oscillator at frequency f2, which
18 produces a new signal at the sum and difference of
19 the input frequencies.
20 Q Why would you typically need to multiply
21 two signals together in an RF digital signal
22 processing circuit?
23 A So the front end of a low-IF receiver, as
24 shown in my declaration above paragraph 64, has
25 two mixers or multipliers. Again, those terms are

1 used interchangeably. And I'm not sure what color
2 you would call it. Pink maybe. No. Not pink.
3 It is darker than pink. Whatever -- you see the
4 two circles with the X? That's a typical
5 application of a multiplier, a mixer in a low-IF
6 receiver.
7 Q Are mixers also sometimes used for
8 downconverting a signal?
9 A It is a component as part of
10 downconversion of a band of frequencies as shown
11 in the diagram I was just referring to.
12 Q Are there other circuitries that can be
13 used to downconvert a signal other than mixers?
14 A There might be, but I haven't really
15 thought about that.
16 Q Sitting here now, can you think of any
17 circuitry, other than mixers, that can be used to
18 downconvert a signal?
19 A Well, again, I'm not sure if your
20 question is broad like in the context of this
21 application we've been talking about and what
22 frequencies you're talking about or a number of
23 other parameters. So it is hard to generalize an
24 answer unless we're talking about a specific
25 application.

1 Q So I'll repeat my question. You tell me
2 specifically what information you need to answer
3 my question.
4 The question is, generally, sitting here
5 now, can you think of a circuit other than a mixer
6 that can be used to downconvert an RF signal?
7 A I haven't thought about that. I was
8 looking at the context of the patents and using
9 mixer components as part of downconverting the
10 band of frequencies.
11 Q What does radio denote in the term
12 radiofrequency?
13 A I'm not sure I know the answer to that
14 question. It -- I mean, a radio, you know, back
15 in the '40s, you know, or whatever -- a long
16 time ago, right, you would listen to the radio.
17 So you could hear audio coming from broadcast
18 audio sources on a radio.
19 Q Okay. Do you know -- strike that.
20 How many cases have you been a consultant
21 regarding patent validity?
22 A I cannot recall.
23 Q Do you have an estimate?
24 A I've worked on patent invalidity more
25 than I have patent validity.

1 Q And I do not mean to distinguish between
2 those two, so I will rephrase my question. And I
3 appreciate your clarification.
4 Do you have an estimate on the number of
5 cases where you worked on either patent validity
6 or invalidity?
7 A So is an IPR declaration considered
8 patent invalidity?
9 Q Yes.
10 A Thank you for that. Yes, I have worked
11 on maybe -- I'm thinking on the order of 20 or so
12 IPR declarations.
13 Q Do you know what it means when we say
14 that a phrase is a term of art?
15 ATTORNEY QUALEY: Objection to form.
16 THE WITNESS: I'm not sure. That might
17 be a legal term. Perhaps you could help me with
18 that definition.
19 BY ATTORNEY HENDIFAR:
20 Q So I want to know if you know what it
21 means. I'm not trying to -- I just want to
22 understand your degree of knowledge. So the
23 question is, in patent validity or invalidity
24 analysis, do you know what a term of art means,
25 what the phrase term of art means?

1 ATTORNEY QUALEY: Objection to form.
2 THE WITNESS: I mean, I'm not an
3 attorney. And I'm not sure I used that phrase in
4 my declaration. Perhaps I did. And if I did, I
5 can look at my declaration and refresh my memory
6 about that. But I don't know if I used that
7 phrase.
8 BY ATTORNEY HENDIFAR:
9 Q Okay. Outside of the context of the
10 patents here, generally in the field of receivers,
11 does the phrase radio front end have a meaning to
12 a POSITA?
13 A Can you read that back again, please?
14 Q Of course. Outside of the context of the
15 patents, does the phrase radio front end have a
16 meaning to a POSITA in the field of RF receivers?
17 A It might. I haven't thought about that.
18 I tried to focus on the invalidity and the
19 analysis of the patents and prior art that were in
20 this field. So outside of this field, I really
21 haven't thought about that.
22 Q Have you heard of the phrase radio front
23 end outside of the context of these IPRs?
24 A I probably have, yes.
25 Q Okay. And what does it mean?

1 A Well, I think I have not rendered an
2 opinion on the definition of radio front end in my
3 declaration, other than the one where I -- where I
4 quoted previously in the context of the patent as
5 part of the tuner. But I don't even think I used
6 the word radio front end at that point. Perhaps I
7 can go back and look and see what that quote was
8 exactly.
9 Q And that's, again, not answering the
10 question I asked. You testified that outside of
11 this IPR, you have previously heard the phrase
12 radio front end. Do you recall that?
13 A Yes. I probably have heard that. So I
14 think that's what I said.
15 Q Yes. My question is, what did you
16 understand the phrase radio front end to mean when
17 previously outside of this IPR you heard that
18 phrase?
19 A I don't remember.
20 Q Okay. Does a person of ordinary skill
21 understand the meaning of the phrase digital front
22 end, outside of the context of the patents?
23 A I don't know that digital front end is
24 a -- is a common term that is thrown around. I
25 mean, I understand the patents and -- and what was

1 described as part of the digital front end, but --
2 but I don't think that that's a really common
3 term.
4 Q Outside of the context of these IPRs,
5 have you heard of the phrase digital front end?
6 A I don't think I have.
7 Q What does downconversion mean?
8 A So in the context of the patent -- and as
9 I'm talking about in paragraph 64 of my
10 declaration -- front end performs frequency
11 downconversion of the RF signals. And that means
12 changing the band of frequencies down to a lower
13 frequency for those signals.
14 Q Does downconversion have to be done by a
15 mixer circuit?
16 A I think I answered that in the context of
17 the patent. We use mixer circuits to downcode --
18 downconvert the RF signals.
19 Q And, again, this is now the sixth time
20 that you changed the question that I asked you and
21 you answered a different question. I asked you if
22 downconversion has to be done by a mixer. And
23 then you switched the question to in the patent it
24 is done by a mixer. But that's not my question.
25 The question was, does downconversion

1 have to be done by a mixer?
2 A There may be other ways. I don't -- I
3 haven't thought about that. I thought about the
4 downconversion using mixers as part of my
5 declaration.
6 Q Have you designed circuitry that at least
7 in part performed downconversion of RF signals?
8 A Can you repeat that again, please?
9 Q Of course. Have you ever designed
10 circuitry that at least in part performed
11 downconversion of RF signals?
12 A I think so, yes.
13 Q Have you always used a mixer to achieve
14 downconversion of an RF signal?
15 A Well, it is hard to say always. I can
16 recall using a mixer or downconversion of an RF
17 signal.
18 Q Do you recall having used any method
19 other than a mixer to achieve downconversion of an
20 RF signal?
21 A Well, when you say a mixer, do you
22 literally mean one?
23 Q One or more.
24 A So what was the question again?
25 Q Do you recall having used -- strike that.

1 Do you recall in any of the circuitries
2 that you have designed achieving downconversion of
3 an RF signal by a method other than using one or
4 more mixers?
5 A I don't recall.
6 Q Now, your work at Cisco and Scientific
7 Atlanta, was it focused more on cable systems or
8 satellite systems?
9 A Mostly cable systems.
10 Q Have you generally worked -- strike that.
11 How are cable tuners different from
12 satellite tuners?
13 A What was the first word?
14 Q How are cable tuners different from
15 satellite tuners?
16 A Well, cable, you generally tune at
17 different frequencies than satellite. But the
18 components, the architecture, let's call it, of
19 the tuners are very similar.
20 Q Now, may I please refer you to the Zhang
21 reference.
22 A Okay. I have it.
23 Q May I please refer you to Figure 1 in
24 Zhang.
25 A Okay. I have it.

1 Q What does Figure 1 in Zhang denote?
2 A It says prior art.
3 Q And -- okay. What is the circuitry in
4 Zhang Figure 1 doing? What is the purpose?
5 A It's a simplified and high-level block
6 diagram of a traditional multi-channel cable and
7 satellite demodulator that is used in cable and
8 satellite systems.
9 Q Thank you. What is each Box 1 or 2 in
10 Zhang Figure 1?
11 A He calls them receiver chains 102a, 102b,
12 and 102c.
13 Q And what does a receiver chain mean?
14 A According to paragraph 6 of Zhang, each
15 chain includes a tuner 110 analog-to-digital
16 converter (ADC) 120 and a digital demodulator 130.
17 Q And why are there multiple boxes 102 in
18 Zhang's Figure 1?
19 A I think what Zhang is showing is the art
20 that existed before the Zhang patent where there
21 was a tuner, an A-to-D converter, and a
22 demodulator forward error correction chain, 102a,
23 for each television channel that was to be
24 delivered by the transport interface.
25 Q Do you agree with Zhang's

1 characterization that the state of the art prior
2 to Zhang was as shown in Zhang's Figure 1?
3 ATTORNEY QUALEY: Objection to form.
4 THE WITNESS: I have no reason to dispute
5 Zhang's characterization as Figure 1 as prior art.
6 BY ATTORNEY HENDIFAR:
7 Q Okay. Now, in Figure 1 of Zhang, what
8 does transport interface mean?
9 A Well, he's talking about the sections
10 that are after the 102 boxes.
11 Q Okay. Now, does the phrase transport
12 interface have a meaning to a POSITA?
13 A So Zhang describes the digital transport
14 interface receives a selected RF channels from one
15 or more demodulators to output the selected RF
16 channels.
17 Q Where are you reading?
18 A Claim 5 of Zhang.
19 Q Right. But that doesn't answer my
20 question. The question is, does the phrase
21 transport interface have a meaning to a POSITA?
22 A So a POSITA would certainly understand
23 that it is configured to receive the RF channels
24 from one or more demodulators to output the
25 selected RF channels.

Q Okay. And what does the transport interface output the channels to?
A I'm sorry. I couldn't understand a couple words. Can you repeat?
Q Sure. What does the transport interface output the channels to?
A I'm not sure Zhang discloses that. He just is talking about outputting.
Q Okay. As an expert, do you have an opinion as to what a POSITA would understand in Zhang's Figure 1 where does the transport channel output the signals?
A I didn't understand a word. Sorry.
Q Sure. As an expert, do you have an opinion as to whether a POSITA would understand that in Zhang's Figure 1 where does the transport interface output the channels to?
A Well, so it is generally to watch television. So it could be a number of different interfaces to do that. I think that's the context of what we're talking about here, is watching or recording television channels.
Q So it would go to a DVR or a monitor?
A I mean, there's a lot of blocks that would, say -- would be needed to -- to accomplish

that. But that's the application I think that he is describing.
Q May I please refer you to paragraph 8 of Zhang.
A I have it.
Q The first sentence reads, quote, "Each RF channel requires one analog tuner and analog band-pass or low-pass filters." Do you see that?
A Yes.
Q In Zhang's prior art, why was there one tuner for each channel as opposed to a single wideband tuner for multiple channels?
A Zhang is describing a different architecture, a new and better architecture. So he is basically describing the previous architectures for implementing similar functionality.
Q Okay. Was there -- in what way is Zhang's architecture better than its prior art as shown in Figure 1?
A So paragraph 9 of Zhang contains at least some of the answer, which is this invention that he's disclosing provides a method and circuitry for demodulating signals, such as downstream signals. At least some embodiments are

characterized by lower cost, lower power consumption, and/or lower complexity.
Q What is a band-pass filter?
A A band-pass filter generally is a filter that blocks out within reason signals that are below a certain frequency and above a certain frequency and -- or attenuates, I should say, those low and high frequencies that are outside of the pass band of the pass-band filter. And passes signals that are within the pass band.
Q What is a low-pass filter?
A It is similar in that it passes some signals and doesn't pass others. Or let's say passes signals that are lower than a certain frequency and attenuates signals that are above a certain frequency.
Q May I please refer you to paragraph 7 of Zhang. And the sentence that reads, quote, "Each tuner then converts the frequency of its selected RF channel to a lower fixed frequency pass band or cable systems or to baseband for satellite systems," end quote. Do you see that sentence?
A I do see that, yes.
Q Why is the downconversion frequency different for cable systems as opposed to

satellite systems?
A So as I say in paragraph 51 of my '362 declaration, television channels from satellite networks occupy various bands in frequencies greater than 950 megahertz. And I cite one of the references for that.
Q Right. And that paragraph in your declaration that you just read from refers to the received RF signal before the conversion; correct?
A Could you repeat that, please?
Q Sure. That paragraph that you read from in your declaration, receives -- sorry, refers to the RF signal frequency range before downconversion; correct?
A Yes.
Q Now, my question was about the downconversion frequency. So after downconversion. The question is, why -- based on what is said in paragraph 7 of Zhang, why is the downconversion frequency different for cable systems as opposed to satellite systems?
A Can you explain to me what you mean by downconversion frequency?
Q Sure. Do you see the sentence in paragraph 7 of Zhang where it says, quote, "Each

1 tuner then converts the frequency of its selected
2 RF channel to a lower frequency" -- "to a lower
3 fixed frequency pass band for cable systems or to
4 baseband for satellite systems," end quote. Do
5 you see that sentence?
6 A I do.
7 Q And that sentence is referring to
8 downconverting the RF channel; correct?
9 A Yes.
10 Q The question is, why is the
11 downconversion frequency different for cable
12 systems as opposed to satellite systems?
13 A I don't think he is saying that they are.
14 Q Okay.
15 A I'm -- and -- and I don't think they need
16 to be, by the way. So I think what he is saying
17 here is you're converting to a lower frequency
18 band or baseband. And it can be cable or
19 satellite systems.
20 Q So you don't read paragraph 7 of Zhang to
21 say that you downconvert the RF channel to a lower
22 fixed frequency pass band for cable systems and to
23 baseband for satellite systems? You don't read it
24 that way?
25 A I read it that you convert to a lower

1 frequency pass band. And, again, this is prior
2 art. This is not talking about Zhang's disclosed
3 invention. But each tuner converts its
4 frequencies to a lower frequency pass band or
5 baseband for cable or satellite systems. That's
6 the way I read it. And that's the way I
7 understand it, having worked on both cable and
8 satellite systems.
9 Q Okay.
10 A And a POSITA would also, I believe.
11 Q Okay. May I please refer you to
12 paragraph 10 of Zhang. Specifically the sentence
13 that reads, quote, "A digital channel
14 demultiplexer receives the multi-channel digital
15 RF signal from the ADC and demultiplexes the
16 multi-channel digital RF signal into separate
17 digital RF channels," end quote. Do you see that?
18 A I'm -- I just now found it. So -- to
19 keep you from repeating it, is that just the last
20 sentence of paragraph 10?
21 Q Yes.
22 A Okay. Thank you. I see that last
23 sentence.
24 Q What does it mean to demultiplex the
25 multi-channel digital RF signal into separate

1 digital RF channels?
2 A So he is talking about the channel
3 selection functionality of his invention, which
4 allows selection of channels of interest.
5 Q Is that your answer? You're done?
6 A Yes.
7 Q What does it mean to demultiplex a signal
8 into separate digital channels?
9 A I think that's a question I just
10 answered.
11 Q It is a little bit different, but let me
12 step back.
13 Do you know what demultiplexing means?
14 A Sure.
15 Q Okay. Does -- have you heard of the term
16 demultiplexing outside of the context of this IPR?
17 A Yes.
18 Q Does a POSITA generally understand what
19 the phrase demultiplexing means?
20 A There's a lot of different contexts and
21 applications. But yeah, sure. I mean, they would
22 certainly understand some ways demultiplexing is
23 used.
24 Q What does it mean to demultiplex a
25 signal?

1 A So it is kind of like you take a signal
2 and then you output parts of that signal that were
3 separated into parts from the original signal.
4 And it is exactly what Zhang is saying. He's --
5 he's taking the multi-channel RF signal and
6 essentially outputting separate digital RF
7 channels.
8 Q Thank you very much for that.
9 In paragraph 26 of Zhang -- please let me
10 know when you're there.
11 A Okay.
12 Q The sentence that reads, quote, "In this
13 specific embodiment, a bandpass filter 212, which
14 is a part of down-converted 210, reduces aliasing
15 from unwanted channels," end quote. Do you see
16 that?
17 A I do.
18 Q What does aliasing mean?
19 A It is basically talking about a signal
20 that you don't want that -- that you're
21 essentially trying to filter out as part of trying
22 to recover the signal that you are interested in.
23 Q What is the source of aliasing?
24 ATTORNEY QUALEY: Objection to form.
25 THE WITNESS: There can be many sources

1 of aliasing. I didn't really render an opinion on
2 that in my declaration, I don't think. If I did,
3 please let me know, and I'll be glad to answer a
4 question about it.
5 BY ATTORNEY HENDIFAR:
6 Q Okay. Now, if I limit my question to
7 paragraph 26 of Zhang, the question will be, in
8 your opinion as an expert, in paragraph 26 of
9 Zhang, what is the source of aliasing from
10 unwanted channels that Zhang tries to reduce?
11 A I don't think Zhang discloses that. And
12 I didn't render an opinion on that, so I'm not
13 really comfortable rendering a new opinion.
14 Q Does downconverting a frequency band
15 typically result in aliasing?
16 A It depends on what tuner architecture
17 you're using.
18 Q Okay. In Zhang's architecture, does
19 downconversion of RF signals typically result in
20 aliasing?
21 A He's saying that in this -- in this
22 specific embodiment, it reduces aliasing from
23 unwanted channels. That's what Zhang is
24 disclosing.
25 Q Right. So I'm asking your opinion as an

1 expert. Is it your opinion that in an
2 architecture such as Zhang's Figure 2,
3 downconverting an RF signal would typically result
4 in aliasing?
5 A No. Zhang is disclosing that it reduces
6 aliasing.
7 Q The aliasing comes from somewhere; right?
8 A Is that like a question or -- is there a
9 question?
10 Q Sure. Yes. The question is, do you know
11 what aliasing means?
12 A I think I've answered that question.
13 Q Mr. Lett, do you know what aliasing
14 means? It's a yes-or-no question.
15 A I think I have answered that question.
16 Q Are you refusing to answer my question
17 now?
18 A Do you want me to go back and repeat my
19 previous answer?
20 Q The question is, do you know what
21 aliasing means?
22 A In the context of Zhang's patent, I
23 understand what Zhang is disclosing as aliasing
24 and reducing the unwanted signals by his invention
25 tuner architecture.

1 Q Sure. And I didn't ask if you understand
2 in the context of Zhang what Zhang is saying.
3 That was not the question. The question is, do
4 you know what aliasing means?
5 A I do, yes.
6 Q What is your understanding of what
7 aliasing means?
8 A It depends on the tuner architecture.
9 Q I actually forgot to ask a question. In
10 your CV, on the last page, it talks about Masters
11 of Science in electrical engineering course work.
12 Did you ever complete the master's degree?
13 A No.
14 Q How much of the master's degree course
15 work did you complete?
16 A I stated in paragraph 5, I completed
17 40 percent of the required degree hours.
18 Q And does -- do you recall if any of the
19 course work you took in your master's program
20 discussed the meaning of the phrase aliasing?
21 A I'm sure we talked about that, yes.
22 Q Now, do I recall correctly that you
23 stated that Zhang does not say where aliasing from
24 unwanted channels comes from? Correct?
25 A I don't think he did. If he did, maybe

1 you can point me to it, and I can answer a
2 question about it.
3 Q Now, my question, as an expert, are you
4 able to determine in paragraph 26 of Zhang what
5 the source of aliasing from unwanted channels is?
6 A So, again, Zhang is describing reducing
7 aliasing with his architecture. He's not
8 describing aliasing in his architecture of the
9 disclosed invention.
10 Q In order to reduce aliasing, there must
11 be aliasing to reduce; right?
12 A So when he is talking about aliasing, he
13 is talking about a prior art architecture that
14 had, in his opinion, aliasing that he could
15 improve significantly or -- he could improve
16 significantly in his disclosed invention.
17 Q So what is the source of aliasing in
18 Zhang's prior art that Zhang's invention reduces?
19 A It would be easier if we looked at the
20 Mirabbasi reference. Because then he goes through
21 multiple receiver architectures and describes some
22 that have a significant aliasing issue and some
23 that have a much less reduced aliasing issue.
24 Q You are more than welcome to go through
25 any reference you like. The question is, what is

1 the source of aliasing in Zhang's prior art that
2 Zhang intends to reduce as stated in this
3 paragraph 26?
4 A It is hard to say because I'm not sure
5 what in the prior art he's comparing it to in
6 terms of the inner circuits and the implementation
7 of those circuits. What he is showing is a very
8 high-level block diagram in -- let me make sure
9 that I have the right figure number. Figure 1,
10 right, that just shows an RF tuner. That's a box,
11 right. And -- and he doesn't disclose what
12 architecture is used within the RF tuner box 110A.
13 Q Now, in paragraph 26 of Zhang, it also
14 says, quote, "Because demodulator 200 requires" --
15 A Hang on just a second. Let me get there.
16 Q Okay.
17 A I'm sorry. What paragraph?
18 Q 26.
19 A Okay. I have it. Thank you.
20 Q Do you see the sentence that says, quote,
21 "Because demodulator 200 requires only one
22 single-stage frequency-block down-converter,
23 instead of many RF tuners as in the prior art, the
24 cost of the overall system is reduced," end quote.
25 Do you see that sentence?

1 A I do, yes.
2 Q Are you able to explain as an expert what
3 insight did Zhang have that allowed it to use one
4 single-stage frequency-block downconverter as
5 opposed to its prior art of using multiple RF
6 tuners?
7 A I'm sorry. Repeat the question again,
8 please.
9 Q Sure. As an expert, are you able to
10 explain what insight did Zhang have that allowed
11 it to use one single-stage frequency-block
12 downconverter as opposed to its prior art of using
13 multiple RF tuners?
14 A So if you look at my declaration,
15 paragraph 192 --
16 Q Which declaration? I'm sorry.
17 A The '362 declaration.
18 Q Okay.
19 A You can see that an illustration of what
20 is in the frequency-block downconverter block 210,
21 as shown by Mirabbasi.
22 Q Okay. Maybe my question wasn't clear.
23 I'll give you layman explanation, and then I'll
24 ask the question more formally. I am trying to
25 understand why didn't everybody at the time just

1 use multiple RF tuners into a single circuit with
2 a single-block downconversion? What is it that
3 Zhang discovered that allowed to do it when nobody
4 else did it? So I'm trying to figure what is that
5 insight that Zhang has? So let me now ask my
6 question.
7 What is the novel insight in Zhang's
8 disclosed invention that allowed it to improve
9 upon his prior art of using multiple RF tuners
10 into an architecture of using a one-stage
11 frequency-block downconverter?
12 ATTORNEY QUALEY: Objection to form.
13 THE WITNESS: Can you break that up into
14 sections for me?
15 BY ATTORNEY HENDIFAR:
16 Q Sure. Do you agree that Zhang's use of a
17 single-stage frequency-block downconverter was an
18 improvement over its prior art of using multiple
19 RF tuners?
20 A That's what Zhang discloses in paragraph
21 26.
22 Q Right. I agree with that.
23 A I have no reason to agree or disagree. I
24 believe that he discloses that.
25 Q So you don't have an opinion one way or

1 another as to whether Zhang's architecture of
2 using one single-stage frequency-block
3 downconverter was an improvement over the prior
4 arts used of multiple RF tuners?
5 A So at the time that Zhang disclosed this,
6 I believe that was true. And, you know, he -- he
7 illustrates how to do that and the improvements
8 therein.
9 ATTORNEY QUALEY: Counsel, can -- can we
10 have a lunch break coming up here?
11 ATTORNEY HENDIFAR: Good time. We can
12 take a break now, if you would like. How long of
13 a lunch break would you like?
14 ATTORNEY QUALEY: Say we'll be back at
15 1:45.
16 ATTORNEY HENDIFAR: Sure. So like about
17 half an hour. 45 minutes past this current hour?
18 All right. Thank you very much. We will see you
19 in about half hour.
20 ATTORNEY QUALEY: Thank you.
21 (A recess was taken.)
22 BY ATTORNEY HENDIFAR:
23 Q Welcome back, Mr. Lett. During the
24 break, did you speak with anybody regarding the
25 substance of your deposition today?

1 A No.
2 Q Do you recall that before the break, we
3 were discussing paragraph 26 of Zhang?
4 A Yes.
5 Q And do you recall that you testified that
6 prior to Zhang, the state of the art was to use
7 multiple RF tuners as opposed to a single-stage
8 frequency-block downconverter?
9 ATTORNEY QUALEY: Objection to form.
10 THE WITNESS: Can you repeat that?
11 BY ATTORNEY HENDIFAR:
12 Q Of course. Do you recall that you
13 explained that prior to Zhang, the state of the
14 prior art to Zhang was using multiple RF tuners as
15 opposed to a single-stage frequency-block
16 downconverter?
17 A I think I testified that that's what
18 Zhang discloses, yes.
19 Q Do you recall testifying that you agree
20 with that statement?
21 A I have no reason to dispute it.
22 Q Now, as an expert, do you have an opinion
23 as to what prevented Zhang's prior art from using
24 a single-stage frequency-block downconverter as
25 opposed to multiple tuners?

1 A So that requires some speculation. And
2 I'm not really comfortable with that. Zhang
3 discloses that his invention is an improvement
4 over the prior art.
5 Q When you say that requires speculation,
6 is that because you don't have an opinion or you
7 don't have the knowledge to make that opinion, or
8 what other reason is there that my question
9 requires a speculation?
10 A Can you read back the previous question?
11 Q Of course. The question was what
12 prevented Zhang's prior art from using a
13 single-stage frequency-block downconverter instead
14 of multiple RF tuners?
15 A I don't think Zhang disclosed what
16 prevented him from doing that. Perhaps he did.
17 If he did, I'll be happy to answer a question
18 about it.
19 Q But as an expert, you don't know the
20 answer to that question?
21 A I have a pretty good idea, but I'm not
22 going to speculate of which of those ideas might
23 be the reason.
24 Q Okay. Would you please let us know the
25 universe of the ideas that you have?

1 A I don't think I rendered an opinion on
2 that in my declaration. And I'm not comfortable
3 with coming up with a new opinion at this point.
4 Q But you testified that you have a pretty
5 good idea of what prevented Zhang's prior art from
6 using a single-stage frequency-block downconverter
7 as opposed to multiple tuners. And that's in the
8 record. Do you recall that statement?
9 A Yes.
10 Q What is your pretty good idea as to why
11 or as to what prevented Zhang's prior art from
12 using a single-stage frequency-block downconverter
13 as opposed to multiple RF tuners?
14 A So I don't think a pretty good idea is
15 necessarily fact. So I would propose that -- that
16 we stick to the facts.
17 Q Mr. Lett, you don't get to dictate what
18 my question is. So the question is what the
19 question is. And I appreciate your proposal. But
20 I'm still entitled to ask my question. And you
21 are required to answer the question.
22 So the question -- I'll repeat it. Do
23 you recall stating that you have, quote, a pretty
24 good idea, end quote, as to what prevented Zhang's
25 prior art from using a single-stage

1 frequency-block downconverter instead of multiple
2 RF tuners? Do you recall making that statement?
3 A Yes.
4 Q The question is, what is your, quote,
5 pretty good idea, end quote, as to what prevented
6 Zhang's prior art from using a single-stage
7 frequency-block downconverter instead of multiple
8 RF tuners?
9 A That's a new opinion that I would not
10 like to render on the fly.
11 Q Are you refusing to answer this question?
12 A Yes.
13 ATTORNEY HENDIFAR: Counsel, we would
14 call the Board if Mr. Lett refuses to answer the
15 question. Because it is a basic question. He
16 said he has a pretty good idea. He is refusing to
17 state it. So if we have to call the Board, we
18 will.
19 ATTORNEY QUALEY: Counsel, he -- I mean,
20 he has put caveats on it that he doesn't know what
21 Zhang's -- I mean --
22 ATTORNEY HENDIFAR: But the record is
23 clear. We can read it back for the Board. He
24 said he has a pretty good idea. I asked him what
25 it is. He is refusing to state. So I mean, the

1 record is clear that he is refusing to answer the
2 question, even though he has -- says he has a,
3 quote, pretty good idea. I don't think Mr. Lett
4 gets to decide which questions he answers. So I
5 do request that you advise him to answer the
6 question, or we can ask the Board.
7 ATTORNEY QUALEY: If he -- under the
8 caveat that he is only giving it as a -- as a,
9 what, speculative, pretty good idea --
10 ATTORNEY HENDIFAR: Sure.
11 ATTORNEY QUALEY: -- he can answer the
12 question.
13 BY ATTORNEY HENDIFAR:
14 Q Okay. So Mr. Lett, I'll ask the
15 questions again. Do you recall testifying that
16 you have, quote, a pretty good idea, end quote, as
17 to what prevented Zhang's prior art from using a
18 single-stage frequency-block downconverter instead
19 of multiple RF tuners? Do you recall that
20 statement?
21 A Yes.
22 Q Would you please explain what your,
23 quote, pretty good idea, end quote, is as to what
24 prevented Zhang's prior art from using one
25 single-stage frequency-block downconverter instead

1 of multiple RF tuners?
2 ATTORNEY QUALEY: Objection to form.
3 THE WITNESS: Can you reread that last
4 question?
5 BY ATTORNEY HENDIFAR:
6 Q Of course. Would you please explain what
7 your, quote, pretty good idea, end quote, is as to
8 what prevented Zhang's prior art from using a
9 single-stage frequency-block downconverter instead
10 of multiple RF tuners?
11 ATTORNEY QUALEY: Objection to form.
12 THE WITNESS: So the technology of
13 analog-to-digital converter performance was such
14 that one could digitize the RF input spectrum at
15 the time Zhang disclosed his invention.
16 BY ATTORNEY HENDIFAR:
17 Q But is it basically in your opinion --
18 well, let me caveat that. Did I understand you
19 correctly that, quote, the pretty good idea, end
20 quote, that you had regarding paragraph 26 of
21 Zhang is that the improvements in the
22 analog-digital converters permitted Zhang's
23 architecture of using a single-stage
24 frequency-block downconverter?
25 A That was one of the reasons that, you

1 know, the -- the implementation as Zhang describes
2 includes many components of which
3 analog-to-digital converter is one of them. But
4 to implement the -- the invention as described by
5 Zhang, one would need, let's call it, an
6 improvement in analog-to-digital convert --
7 converter performance so you could have a
8 single-stage frequency-block downconverter.
9 Q And I appreciate that technical
10 explanation. What was the improvement in the
11 technology of the analog-digital converters that
12 permitted a single-stage frequency-block
13 downconverter at the time of Zhang?
14 A Yeah, they were --
15 ATTORNEY QUALEY: Objection to form.
16 THE WITNESS: Can you repeat that?
17 BY ATTORNEY HENDIFAR:
18 Q Of course. What was the improvement in
19 the technology of the analog-digital converters
20 that permitted the implementation of a
21 single-stage frequency-block downconverter at the
22 time of Zhang?
23 A The speed of the analog-digital
24 converter, the sampling rate could be high enough
25 so that it was -- you are able to recover, let's

1 call it, a band of frequencies with one -- one
2 A-to-D converter. Or in the case of I and Q, you
3 know, the I version and the Q version of those
4 multiple channels.
5 Q I appreciate that.
6 Is there a preference process -- strike
7 that.
8 May I please refer you now to paragraph
9 27 of Zhang. And please let me know when you're
10 there.
11 A Okay.
12 Q Do you see the sentence in paragraph 27
13 of Zhang that reads, quote, "In this specific
14 embodiment, ADC 220 is a high-speed ADC so an
15 entire signal band with n converters can be
16 converted." Do you see that?
17 A Yes.
18 Q In Zhang, does the lower case letter n
19 refer to the number of channels in the input RF
20 signal?
21 A No.
22 Q Okay.
23 A So Zhang uses C1 to Cn at various places
24 in the specification. And those are the selected
25 channels. And there a number of words for

1 selected, but that's one of them.
2 Q Do you contend that the letter n, lower
3 case letter n, refers to different things in
4 different places in Zhang?
5 A It is hard to say. You know, he might
6 have meant, you know, converting desired and
7 undesired channels. He probably -- yeah. In this
8 sentence, he is talking about digitizing the band,
9 including desired and undesired channels. Whereas
10 later -- and I -- I stand corrected a little bit
11 on my statement. I just may -- later, he uses n
12 with C with a subscript n -- n to indicate those
13 are the selected or desired channels.
14 Q So you agree that in paragraph 27 of
15 Zhang, in the sentence that says, "In this
16 specific embodiments" -- "embodiment, ADC 220 is a
17 high-speed ADC so an entire signal band with n
18 channels can be converted," end quote. So you
19 agree in this sentence, lower case letter n refers
20 to both desired and undesired channels within the
21 entire band; correct?
22 A It seems to, yes.
23 Q Now, going to paragraph 28, the
24 sentence -- and please let me know when you're
25 there.

1 A Okay.
2 Q Paragraph 28, the sentence in Zhang that
3 reads, quote, "A digital channel demultiplexer 230
4 then demultiplexes the multi-channel digital RF
5 signal into separate digital RF channels C1 to
6 Cn," end quote. Do you see this sentence?
7 A Yes.
8 Q Is it your contention that the subscript
9 lower letter case n in paragraph 28 means
10 something different than the lower letter n number
11 of channels in paragraph 27?
12 A I'm sorry. I don't see an n in paragraph
13 27.
14 Q Okay. Didn't we read the sentence --
15 A Oh. I'm sorry. I'm sorry. I just
16 missed it.
17 Q Let me repeat the question again. Is it
18 your contention that the lower case letter n in
19 paragraph 28 means something different than the
20 lower letter -- the lower case letter n in
21 paragraph 27?
22 A So it can be the same. So what Zhang is
23 disclosing is a -- a demultiplexer where you can
24 output up to n channels. So -- and so you could
25 say all of them are selected. Right. In which

1 case n is the same between those two paragraphs.
2 So the -- so I could -- I could have C1 through
3 Cn. I could have, say, for example -- so say my
4 entire band had -- I don't know. Pick a number.
5 150 channels. Right. I could have C1 up to C150.
6 So it could be the same. It depends on how
7 many -- how many desired channels you want. And
8 if you said they're all desired, then it is the
9 same as -- as the number of channels coming in,
10 with the example that I described.
11 Q So is it your testimony that lower case
12 letter n in Zhang does mean all the channels in
13 the entire band signal, but then Zhang discloses
14 that C1 through Cn, that is demultiplexed from the
15 input signal can be up to n channels but not
16 necessarily n channels?
17 A I'm sorry. I don't understand the
18 question.
19 Q Sure. That's fine. Did I understand you
20 correctly that you are opining that the channels
21 C1 through Cn demultiplexed from the input signal
22 in Zhang is up to n channels but can be less than
23 n channels?
24 A Well, so it is a little bit confusing the
25 way you're asking. And it is confusing me. So

1 Zhang is proposing a very flexible architecture in
2 his invention. So as a design choice, one could
3 choose to have C1 to C -- pick a number -- C5.
4 Right. You could say, say I desire only five
5 channels, right, for whatever reason. And you
6 could input, say, 150 channels. And you could --
7 you could -- n would be 150 on the input. I mean,
8 using the paragraph 27. But n is a variable,
9 right. It could be a different number, depending
10 on what you're talking about, right. So n, in my
11 example was 150 coming into the -- to the
12 receiver. You know, and in my example, I could
13 have C1 to C5. And I would have n being 5 with
14 C -- with 5 as a subscript for C. But I could
15 also say, okay, I want 150 channels to come out as
16 desired, as -- as selected with my digital --
17 digital channel DeMux. Zhang 230. And I could
18 have the end to be 150 there. So it just depends
19 on the particular embodiment that one wants to
20 implement.
21 Q Okay. Let us assume an RF input signal
22 with 150 usable digital channels. Okay?
23 A Well, what do you mean by usable?
24 Q Okay. Now, if, for instance, in a cable
25 system, if there is an RF input signal, not all

1 frequencies within that input signal contain
2 usable digital channels; correct?
3 A It could.
4 Q But not necessarily?
5 A It could or could not. It depends.
6 Q Exactly. So -- so I am saying assume an
7 RF input signal that has 150 usable digital
8 channels in that input frequency band. In
9 paragraph 27, number n would be 150 because
10 paragraph 27 says n is the number of channels in
11 the entire band. Correct?
12 A I was just using n as an -- 150 as an
13 example. So, you know, in this hypothetical
14 example that I used, n channels can be converted.
15 In other words, the entire signal band -- and I'm
16 just taking Zhang's sentence. And I just came up
17 with a number n for that sentence, right. Pick
18 whatever number you want. But -- but I just
19 picked 150 as the number.
20 Q I understand. So I'm using that number
21 as an example. So the question is, let us assume
22 as an example an RF input signal with 150 usable
23 digital channels. Then the number n in paragraph
24 27 of Zhang would be 150 in that example. Because
25 paragraph 27 says that n is the number of channels

1 in the entire signal band; correct?
2 A In this example, this hypothetical
3 example, yes.
4 Q Now, is it your testimony that in this
5 example using 150 as the total number of channels,
6 when Zhang, in paragraph 28, says that the
7 demultiplexers channels C1 to Cn, it does not
8 require demultiplexing all of the 150 channels?
9 ATTORNEY QUALEY: Objection to form.
10 THE WITNESS: So as I already stated, one
11 could implement multiple -- multiple -- let's call
12 it elements that generate a C, right. And one
13 could choose in a design to have any number of
14 those that he wanted.
15 BY ATTORNEY HENDIFAR:
16 Q Sure. But -- I didn't mean to interrupt.
17 Sorry. Go ahead.
18 A I think I'm done.
19 Q So my question is not what a person can
20 do. My question is what Zhang actually says. So
21 I'll repeat the question.
22 Assuming, as an example, 150 to be the
23 number -- the total number of channels in the
24 entire signal band, in paragraph 27 of Zhang, the
25 lower case letter n would be 150 because in

1 paragraph 27, Zhang says n is the total number of
2 channels in the entire band. Correct?
3 A I'm sorry. Can you reread that?
4 Q Of course. Taking the example that you
5 used as 150 to be the total number of channels in
6 the entire signal band, because in paragraph 27
7 Zhang says n is the number of channels in the
8 entire signal band, in paragraph 27, n would be
9 150; correct?
10 A I think that's what I said.
11 Q Okay. Now, the follow-up question is, is
12 it nonetheless your testimony that in paragraph
13 28, when Zhang says the demultiplexers channels C1
14 through Cn, in paragraph 28, not all 150 channels
15 need to be demultiplexed as Zhang discloses?
16 ATTORNEY QUALEY: Objection to form.
17 THE WITNESS: So if you look at paragraph
18 42 of Zhang --
19 BY ATTORNEY HENDIFAR:
20 Q Yes.
21 A -- the exact number will depend on the
22 specific application. For example -- and then he
23 goes on to describe that the n can be whatever you
24 need for the application.
25 Q Again, you didn't answer my question.

1 A I'm trying to.
2 Q Sure. Sure. I'm asking you about what
3 Zhang's sentence in paragraph 28 means. Okay?
4 A And I think he explains that later in a
5 different way that perhaps is more understandable
6 in paragraph 42. A single channel multi -- a
7 single multi-channel RF signal can have multiple
8 separate RF signals, channel C1 to C35. And then
9 he goes on to say that the exact number would
10 depend on the specific application. So you can
11 pick n to be whatever you want on both -- on the
12 right side, C1 to Cn, depending on the
13 implementation or the application.
14 Q So it is your testimony --
15 A Up to -- up to the number of channels
16 that are input. Not greater than.
17 Q Sorry. I don't mean to interrupt. I'm
18 sorry. When you pause, I assume you're done. But
19 I apologize if I interrupted.
20 So it is your testimony that in Zhang,
21 the number of channels demultiplexed C1 through Cn
22 does not necessarily have to be the number of
23 channels in the entire signal band; correct?
24 A That's correct. But one could select
25 from any of those channels in the R -- in the

1 input. So as he describes later, and as I
2 disclosed in my testimony, and as is shown in
3 Figure 3 of Zhang, these channel selectors tune --
4 can be tuned to different frequencies. So you can
5 choose whichever of those input channels that are
6 of interest. In other words, the NCOs of Figure
7 3 allow you to select any of those channels in the
8 band. And ever how many you want as -- in you --
9 in your application you decide is desired, that's
10 how many of these elements that are shown in
11 Figure 3 one would -- would -- would build in the
12 design.
13 Q I'm sorry. Are you done?
14 A Yes.
15 Q Now, continuing in paragraph 28 of
16 Zhang -- and please let me know when you're there.
17 A Okay. I'm ready.
18 Q In paragraph 28 of Zhang, the sentence
19 that reads, quote, "Still referring to Figure 2
20 and n×m digital selector 240 receives the
21 demultiplexed digital RF channels C1 through Cn
22 and then selects one or more of the RF channels D1
23 through Dm from one or more of the digital RF
24 channels C1 through Cn," end quote. Do you see
25 that?

1 A "Contain content channels that are used
2 or selected by subscriber," is the last part of
3 that sentence.
4 Q Okay. What does the letter m, as in
5 Mike, denote in D1 to Dm?
6 A So that is the number of channels that
7 are output to the demodulators.
8 Q Okay.
9 A And, again, m can be different depending
10 on whatever implementation a designer would
11 choose, as a design choice.
12 Q What is the purpose of the select or --
13 let me start that.
14 Why doesn't Zhang send all of the
15 demultiplexed channels C1 through Cn to
16 demodulators?
17 A So what Zhang is -- is describing is a
18 very flexible architecture. The -- if you look at
19 Figure 5 of Zhang.
20 Q I'm sorry. Which figure?
21 A Figure 5 of Zhang. You will see that the
22 time division DeMux, which is essentially the n×m
23 selector -- hang on a second. Scratch that.
24 Yeah. So as I say in paragraph 79, my
25 disclosure --

1 Q Yes.
2 A -- digital channel demultiplexer 230
3 separates the signals of all of the content
4 channels in the digital RF signals, channel C1 to
5 Cn, while the n×m digital selector 240 selects and
6 forwards only signals for a subset of content
7 channels selected by the subscriber to one or more
8 demodulators. In other words, it is a switch.
9 Q So what paragraph are you reading from?
10 A I'm looking at paragraph 79 in my
11 declaration.
12 Q Which declaration?
13 A The '362 declaration.
14 Q So are you changing your testimony now
15 that C1 through Cn is all of the content channels
16 in the digital RF input signal?
17 A I didn't say that.
18 Q Okay. You read from your declaration
19 paragraph 79 that says, "A digital channel
20 demultiplexer 230 then separates signals of all
21 the content channels in the digital RF signals,
22 example channels C1 through Cn." Right? You just
23 read from that; right?
24 A I did.
25 Q Okay. So are you testifying that in

1 paragraph 79 of your declaration, you're not
2 stating that channels C1 through Cn are all of the
3 content channels in the digital RF signal?
4 ATTORNEY QUALEY: Objection to form.
5 THE WITNESS: As I explained -- explained
6 previously, n can be less than the number of
7 channels on the input, if one wants to implement
8 less than the number of channels on the input.
9 I'm not changing my testimony. It is the same.
10 BY ATTORNEY HENDIFAR:
11 Q So looking at paragraph 79 of your
12 declaration, in IPR 2024-00432, the sentence that
13 says, quote, "A digital channel demultiplexer 230
14 then separates signals of all the content channels
15 in the digital RF signals, (e.g., channels C1 to
16 Cn), while n by n digital selector 240 selects and
17 forwards on the signals for a subset of content
18 channels selected by a subscriber." Do you see
19 that sentence --
20 A Yes.
21 Q -- in your declaration?
22 A Yes.
23 Q Are you testifying that in this portion
24 of your declaration, you're not stating that C1
25 through Cn are all the content channels in the

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1 digital RF signal?
2 A What I'm saying is -- sorry. Go ahead.
3 ATTORNEY QUALEY: I said objection to
4 form.
5 You can answer.
6 THE WITNESS: What I'm saying is as shown
7 in Figure 3, which is in paragraph 80 of my
8 declaration, of my '362 declaration, the number of
9 elements, 1 through n, is a design choice where
10 the -- each one of these elements, 320, 330, and
11 340, in the case of the top one, 320, 321, 340,
12 parenthesis 1, and, 330, parenthesis 1, what I'm
13 saying is one could choose to implement the
14 digital channel DeMux 230 with less than the
15 number of channels that are input. And each of
16 these channels -- each of these -- let's call
17 it -- I don't know what to call it. But the
18 elements 320, 340, and 330, those elements, the
19 mixer, the NCO, and the low-pass filter, each one
20 of those can tune to any channel in the band.
21 So -- so this digital channel selector, which I
22 illustrated in the box 230 and 240 with the green
23 and -- excuse me, the digital channel
24 demultiplexer with the green and purple, it
25 separates the channels and -- and forwards only

1 signals for a subset of the content channels
2 selected by the subscriber. And by the way, it
3 doesn't have to be selected by the subscriber. It
4 could be selected by other means also.
5 BY ATTORNEY HENDIFAR:
6 Q Why is only a subset of the channels C1
7 through Cn sent to demodulators?
8 ATTORNEY QUALEY: Objection to form.
9 THE WITNESS: Well, that's a speculation.
10 But one could say that why would I want to
11 implement a design that would output 150 channels
12 for viewing? I would probably not be able to
13 practically watch 150 channels at a time. So I
14 might be interested more in like how many would I
15 want to be able to watch and record
16 simultaneously. And it is probably not you want
17 to record and watch every single channel in the
18 cable system, because that's just too much content
19 to be practical. So -- so the practical
20 implementation of Zhang's invention does not
21 exclude having 150 in the example that we've been
22 using with output to demodulators, but it is just
23 really not a practical use case. But he does
24 support the practical uses -- use cases as well as
25 other use cases that are possible. It is a very

1 flexible architecture.
2 BY ATTORNEY HENDIFAR:
3 Q Okay. Now, why does Zhang disclose the
4 multiplexing more channels than the number of
5 channels m sent to demodulators?
6 A I'm not sure he discloses that. Perhaps
7 if he did, you could point me to it, and I can
8 comment on it.
9 Q I'm not sure if he does or if he doesn't.
10 My question is, as an expert, do you have an
11 opinion as to why Zhang discloses the multiplexing
12 more channels than the number of channels m sent
13 to demodulators?
14 ATTORNEY QUALEY: Objection to form.
15 THE WITNESS: I don't know.
16 BY ATTORNEY HENDIFAR:
17 Q Now, you referenced Figure 5 of Zhang.
18 Do you recall that?
19 A I did, yes.
20 Q And Figure 5 of Zhang, for your
21 convenience, is discussed in paragraph 38 of
22 Zhang. But please feel free to look at anywhere
23 in Zhang that you need to when I ask you
24 questions.
25 Now, in Figure 5 of Zhang, what does the

1 number K denote in data bus numbers 1 through K?
2 A It's the number of data buses.
3 Q Okay.
4 A In between those two blocks.
5 Q Okay. Why does Zhang collect multiple
6 channels into different data buses?
7 A What Zhang is disclosing is a very
8 flexible architecture that allows all of the
9 combinations shown with all of the lines in
10 Figure K inside the -- the two boxes. Of Figure
11 5, I meant to say, not Figure K. Do you want me
12 to repeat that?
13 Q No.
14 A Okay.
15 Q Now, where does each data bus go? Does
16 it go to different user?
17 A I'm sorry. I didn't quite get that.
18 Q In Zhang Figure 5, does each data bus go
19 to a different user?
20 A I'm not sure what you mean.
21 Q Okay. What is the function of the time
22 division DeMux in Zhang's Figure 5 selector?
23 A Well, if you look at my paragraph 125 of
24 my declaration, it shows an example of -- that the
25 channel C1 through Cn are time division multiplex

1 as shown in the middle of that annotated figure in
2 that paragraph of my declaration and outputting
3 serially a time division multiplex signal --
4 signal to demodulators using this very flexible
5 architecture.
6 ATTORNEY HENDIFAR: Okay. Is it okay if
7 we take a West Coast half-hour lunch break at this
8 point?
9 ATTORNEY QUALEY: Sure.
10 ATTORNEY HENDIFAR: Great. All right.
11 So we will see you at the top of the hour.
12 ATTORNEY QUALEY: Okay.
13 ATTORNEY HENDIFAR: Thank you very much.
14 ATTORNEY QUALEY: Thank you.
15 (A recess was taken.)
16 ATTORNEY HENDIFAR: Let's go back on the
17 record.
18 Q Mr. Lett, during the break at any point
19 today did you speak with anybody regarding the
20 substance of your deposition?
21 A No.
22 Q Going back to Zhang's Figure 5, if you
23 would, please.
24 A Okay.
25 Q In Zhang's Figure 5, why does Zhang's

1 system use more than one data bus?
2 A I'm not sure I have rendered an opinion
3 on that. I need to think about that.
4 Q Okay. Sitting here now, you don't know
5 why Zhang's Figure 5 uses more than one data bus?
6 A Well, it is showing a very flexible
7 architecture. And part of the flexibility is more
8 than one data bus.
9 Q Right. That doesn't answer my question.
10 The question is, sitting here now, do you know why
11 Zhang uses more than one data bus in its Figure 5?
12 ATTORNEY QUALEY: Objection to form.
13 THE WITNESS: Zhang is showing a very
14 flexible architecture that allows a lot of
15 different functionalities to be supported. And
16 that is part of the flexibility of his design.
17 BY ATTORNEY HENDIFAR:
18 Q In Zhang's Figure 5, what is the
19 advantage of having two data buses as opposed to
20 one data bus?
21 A Again, it's flexible so that one could
22 output in a -- in different ways. Serial,
23 parallel, or to different lines or whatever.
24 There's many options that are available in this
25 very flexible architecture of Zhang.

1 Q Zhang's Figure 5 is showing all data
2 buses 1 through K having the same channel D1
3 through Dm; correct?
4 A Not necessarily.
5 Q Zhang's Figure 5 shows data bus 1 having
6 channel D1, D2 to Dm; right?
7 A That's right.
8 Q And then Zhang's Figure 5 shows data
9 bus 2 also having D1, D2, and Dm; correct?
10 A That's right.
11 Q And Zhang's Figure 5 also shows data bus
12 K having D1, D2, and Dm; correct?
13 A That's right.
14 Q Why does Zhang show all data buses having
15 the same channels?
16 A Again, Zhang is showing a very flexible
17 architecture that is capable of doing many
18 different things. And some of those examples I
19 illustrated through annotated figures of Figure 5
20 in my declaration.
21 Q Okay. So this is now the fourth question
22 or the fifth question that I have asked you, and
23 your answer is Zhang is flexible. What -- which
24 is invasive because it doesn't answer in the
25 specific way why Zhang is showing the circuit, why

1 it is shown in that way. I'm not asking you if
2 you can modify it or if you can use it in
3 different ways. I'm asking you how Zhang
4 specifically -- the circuit that is shown
5 operates.
6 So let me ask you this question: Do you
7 have an opinion as to why in Zhang Figure 5 all
8 data buses 1 through K are shown to have the same
9 channel D1 through Dm?
10 ATTORNEY QUALEY: Objection to form.
11 THE WITNESS: So one example is on
12 page 84 of my declaration. If you look at the
13 bottom of that page -- actually, there's two
14 examples. But he is showing that in one case, he
15 can use the data bus 1 to output D1 to D2, Dm,
16 through the top portion of that time division
17 DeMux. For the other case, he is showing that you
18 can output D1 on the top one using data bus 1,
19 data bus 2 on the -- on the -- for D2, and data
20 bus K for Dm. Depending what you want to do, you
21 can do either or any number of combinations of
22 functionality with Zhang's disclosure.
23 BY ATTORNEY HENDIFAR:
24 Q I see. Now, m is the number of channels
25 that go to the demodulator in Zhang -- in Zhang;

1 correct?
2 A That's right.
3 Q Now, in the example that you have on
4 page 84 of your declaration --
5 A Uh-huh.
6 Q -- the figure you have annotated on the
7 left-hand side, where there are three channels,
8 D1, D2, and Dm, all on data bus 1, do you see
9 that?
10 A Yes.
11 Q Do D1, D2, and Dm each go to a different
12 demodulator?
13 A Well, it could be. So you could do each
14 one. Again, Zhang's architecture -- and I'm sorry
15 to keep saying the same word -- is very flexible.
16 So you can output to -- to different demodulators
17 or you can output to a single multi-channel
18 demodulator with a timed division multiplex
19 stream, as I showed you earlier with the annotated
20 version of Figure 5, where the time division
21 multiplex came out the top D1. So, again, there's
22 many capabilities of Zhang's design.
23 Q Now, the time division DeMux is a time
24 division demultiplexer; correct?
25 A I suppose so. Although, the

1 functionality that Zhang describes is more like a
2 switch.
3 Q That's my question. Because I don't see
4 any time division demultiplexing in what you have
5 explained being performed in Zhang's selector.
6 Did I miss that?
7 A So the -- the left side of Figure 5 on
8 page 84 could indicate demultiplexing of the time
9 division multiplex bus.
10 Q So both the bus selector and the time
11 division DeMux are within the bus -- I'm sorry --
12 are within selector D4; correct?
13 Let me help you out. If you can go to
14 paragraph 38 of Zhang. Please let me know when
15 you have it.
16 A Okay. I have it.
17 Q The last sentence reads, on paragraph 38
18 of Zhang, quote, "Digital selector 500 includes a
19 bus selector 510, one or more multiple data buses
20 520, and a time division multiplexor 530," end
21 quote. Do you see that?
22 A Yes.
23 Q So the time division demultiplexer is a
24 part of Zhang's selector; correct?
25 ATTORNEY QUALEY: Objection to form.

1 THE WITNESS: Again, Zhang's architecture
2 is flexible. So he can demultiplex the signals or
3 he can output the time division multiplex. And
4 can be serial or parallel.
5 BY ATTORNEY HENDIFAR:
6 Q But that does not answer my question.
7 The question is, at least so far as Zhang
8 discloses, the time division demultiplexer 530 is
9 a part of Zhang's selector because Zhang literally
10 says digital selector 500 includes a time division
11 demultiplexer 530; correct?
12 ATTORNEY QUALEY: Objection to form.
13 THE WITNESS: So as I explained in
14 paragraph 121 of my '362 declaration, each bus can
15 be used by multiple RF channels with the use of a
16 time -- the use of time division multiplexing.
17 And each output RF from a channel demultiplexer
18 not shown can be selected to use any data bus.
19 And I'm quoting from paragraph 38 of Zhang.
20 BY ATTORNEY HENDIFAR:
21 Q Sure. But that wasn't my question. My
22 question was, the time division demultiplexer is a
23 part of Zhang's selector; correct?
24 ATTORNEY QUALEY: Objection to form.
25 THE WITNESS: So in my declaration,

1 paragraph 120, "Digital selector 240 teaches the
2 claim selecting of the desired channels in that a
3 channel is both demultiplexed by 230 and switched
4 by 240 to a demodulator is desired in all other
5 channels from the digital multi-channel RF signal
6 or undesired."
7 BY ATTORNEY HENDIFAR:
8 Q Does the paragraph say whether the time
9 division demultiplexer is a part of digital
10 selector?
11 ATTORNEY QUALEY: Objection to form.
12 THE WITNESS: Zhang is disclosing a
13 demultiplexer functionality. He doesn't show the
14 details, I don't think. And perhaps if he did,
15 you can point me to it, and I can comment on it.
16 But he is describing the functionality of that
17 block.
18 BY ATTORNEY HENDIFAR:
19 Q Fine. But that -- again, my question is,
20 the time division demultiplexer in Zhang is a part
21 of the selector, as far as it is shown in Zhang;
22 correct?
23 ATTORNEY QUALEY: Objection to form.
24 THE WITNESS: Well, the segment I just
25 read to it -- read to you says, a channel is both

1 demultiplexed by 230. And that's it.
2 BY ATTORNEY HENDIFAR:
3 Q I see. So the confusion is you're
4 pointing to two different demultiplexers. In
5 Figure 5 of Zhang -- if you can look at Figure 5
6 of Zhang. The time division DeMux 530 is a part
7 of Zhang's digital selector 500; correct?
8 A So yes. Figure 5 at the top says 500 and
9 points to the whole diagram.
10 Q Okay. Very good. Going to page 84 of
11 your declaration again.
12 A Yes.
13 Q Now, on the left-hand side, you show the
14 annotation on the left-hand side at the bottom of
15 page 84 of your declaration. You show three
16 channels -- C1, C2, Cn -- multiplexed together on
17 data bus 1 and then demultiplexed when they leave
18 the time division DeMux. Do you see that?
19 A Yes.
20 Q Why would the channels be multiplexed in
21 bus 1, only then to be multiplexed right within
22 the selector before they're sent out?
23 A All I'm showing are the examples of
24 flexible architecture. The other diagram that I
25 showed of the annotated Figure 5 showed that the

1 time division multiplex data bus 1 was output
2 through the top D1.
3 Q Right. I'm trying to find an example,
4 however, of why there would be a demultiplexing of
5 the same data bus that was multiplexed all within
6 the selector. Do you have an opinion?
7 A Okay. What was the question?
8 Q The question is, why would Zhang
9 demultiplex a data bus that was multiplexed all
10 within the selector?
11 ATTORNEY QUALEY: Objection to form.
12 THE WITNESS: I'm not sure, but for
13 explaining the claim element that I was explaining
14 using Zhang's flexible architecture, perhaps a
15 better illustration is on page 87. Page 87 shows
16 that I'm outputting a time division multiplex
17 stream serially to demodulators.
18 BY ATTORNEY HENDIFAR:
19 Q Is it showing that? So I'm looking at
20 page -- on page 87 of your declaration. You show
21 a data bus 1 that has multiplexed three channels.
22 But then it appears that in the time division
23 DeMux, the channels are separated before they're
24 sent out.
25 A I don't see where you see that. I'm --

1 are you looking at the diagram on page 87?
2 Q I see. So you're saying that D1, the D1
3 line on page 87 of your declaration contains three
4 channels that are multiplexed together?
5 A Correct.
6 Q Even though it says D1, as in one
7 channel?
8 A Correct.
9 Q What is the basis in Zhang of this
10 diagram?
11 A So 530 is just a switch. You can
12 switch -- you can switch whatever --
13 Q What is a switch?
14 A Excuse me?
15 Q What is a switch? I'm sorry.
16 A It is more like a switch.
17 Q What is? What is?
18 A The -- the block 530.
19 Q Okay.
20 A So in this case, we're just switching
21 data bus 1 to the output.
22 Q Okay. But it is called a DeMux. It is
23 not called a switch?
24 A You can clearly see that you can do what
25 I'm showing here with that architecture.

1 Q So, again, I'm not an expert. But what
2 I'm seeing on page 87 of your declaration is that
3 you have shown three channels on a line D1, which
4 Zhang itself just shows one channel, D1. Am I
5 missing something here?
6 A No. Look at -- it is paragraph. It
7 would have been clear to a POSITA the Zhang system
8 is capable of routing all desired channels to a
9 digital data stream to a single demodulator 250.
10 A POSITA would have been well aware that single
11 demodulator at the time, such as demodulator 250
12 in Zhang, were capable of demodulating multiple
13 selected multiple channels. And that is in
14 reference to the diagram that I've been
15 describing.
16 And above that, in paragraph 125,
17 selector 500 is capable of outputting every
18 channel C1 to Cn (green) to D1 (orange) using time
19 division multiplexing as discussed above and
20 further discussed with respect to Claim 2. Zhang
21 selector 500 could also use separate buses to
22 route each channel D1 as discussed above and
23 further discuss below with respect to Claim 3.
24 What -- I keep saying that word flexible. But
25 Zhang's design can do a lot of things.

Q Now, Zhang's selector 240 does not select a select or -- does not select any channels from the output of the analog digital converter in Zhang's Figure 2; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: Can you repeat that?
BY ATTORNEY HENDIFAR:
Q Sure. Looking at Zhang's Figure 2, if you would. Let me know when you're there.
A I mean, is there a question? I didn't hear one.
Q Yes. I'm referring to Figure 2. So I -- for your convenience I can ask you the question. Please let me know when you're there.
A Okay. I have Figure 2.
Q Do you see on the left-hand side there is an RF signal?
A An RF signal input, yes.
Q And then you see an analog digital convertor 220 in Zhang's Figure 2?
A That's right.
Q Okay. I just want to understand your opinion based on your explanation. So in your opinion, the -- in Zhang's Figure 2, the selector 240 is not the module that selects channels from

the digitized input signal; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: So the combinations of 230 and 240 work together to select and output the desired channels to the demodulator.
BY ATTORNEY HENDIFAR:
Q Sure. But that's -- that's not my question. I understand that a selector provides the output. That was not my question.
My question was, based on how you explained Zhang to work in Zhang's Figure 2, the selector 240 module does not select channels from the digitized input signal; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: So perhaps it would help if we looked at paragraph 30 of Zhang.
BY ATTORNEY HENDIFAR:
Q Okay.
A Figure 3 is a simplified high-level schematic diagram of -- of digital tuner 300, which in some embodiments of the present invention can be used to implement digital channel multiplexor 230 of Figure 2. So if you want to see what's inside 230, you look at Figure 3 as one embodiment of --

Q I wasn't asking about Figure 3. I'm sorry. I was asking about the DeMux 230. So I understand that Figure 3 is the DeMux 230. My question was about the selector 240. I'll repeat my question. Maybe that helps you.
My question is, based on how you understand Zhang to work -- and you, I think, explained here -- in your opinion, the selector 240 is not the module that selects channels from the digitized input signal; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: So if you look at paragraph 28 of Zhang, still referring to Figure 2 an n×m digital selector 240 receives the demultiplexed digital RF channel C1 to Cn and then selects one or more of the RF channels D1 to D -- to Dm from the one or more digital RF channels C1 to Cn.
So does that answer your question? That tells you what 240 does.
BY ATTORNEY HENDIFAR:
Q Right. And I am able to read Zhang. But this is my question. And, again, I'm entitled to your response. So there were many responses. So there was one where you said you would not respond until counsel told you that you need to respond.

So I'm able to read Zhang. But that was not my question. The question is, based on how you understand Zhang to work in Zhang's Figure 2, the selector 240 is not the module that selects the channels from the digitized RF input signal; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: So I'm having difficulty answering your question. I read to you what 240 -- 230 does. And I read to you what 240 does. I don't know what more I can do.
BY ATTORNEY HENDIFAR:
Q You can answer my question.
A I -- I don't understand. I thought I answered it multiple times.
Q You did not. So you read to me what 240 does, which you said selects channels from the demultiplex C1 through Cn.
A Right.
Q And you read to me what 230 does, which is demultiplexes channels C1 through Cn from the digitized input signal. Correct?
A And I showed you the block diagram of the inside of 230.
Q Right. And -- but you are the expert.

1 So all of what you read to me put together, does
2 it mean that it is your opinion that in Zhang's
3 Figure 2, it is not the selector 240 that selects
4 channels from the digitized RF input signal output
5 from the analog digital converter 220?
6 ATTORNEY QUALEY: Objection to form.
7 THE WITNESS: So the combination of 230
8 and 240, as I showed earlier with the colors --
9 and I can't remember what they were. They were
10 both the same color, with a hatched pattern. They
11 accomplish the functionality of selecting the
12 channel from the output of the A-to-D converter,
13 the desired channels to the demodulators.
14 BY ATTORNEY HENDIFAR:
15 Q Right. But I didn't ask you what
16 achieves the functionality of output and desired
17 channels to the demodulators. That was not my
18 question. Okay. So please pay attention to what
19 my question is. My question is, based on how you
20 understand Zhang to work, in Zhang's Figure 2, it
21 is not the selector 240 that selects the channels
22 from the digitized RF signal output from the
23 converter 220; correct?
24 ATTORNEY QUALEY: Objection to form.
25 THE WITNESS: So 230 is in the middle of

1 220 and 240. Right. I don't see a line going
2 from 220 to 240.
3 BY ATTORNEY HENDIFAR:
4 Q Okay. I'm not -- I'm not disagreeing
5 with you. So does that mean that in your opinion,
6 in Zhang's Figure 2, it is not the selector 240
7 that selects channels from the digitized RF signal
8 output from the converter 220? Is that your
9 opinion?
10 ATTORNEY QUALEY: Objection to form.
11 THE WITNESS: So the selection of
12 channels from the analog-to-digital converter is
13 done by 230, which is also illustrated in
14 Figure 3, the inside of 230. And then the output
15 can be selected by the n×m selector. So there's
16 more functionality that's built in to the
17 combination of those two blocks than perhaps
18 you're indicating.
19 BY ATTORNEY HENDIFAR:
20 Q Right. And I'm not saying Zhang is
21 limited to that. I'm just looking at one specific
22 functionality. I need to understand what you
23 contend Zhang does that can build up to that. I'm
24 not saying Zhang is limited in -- in the
25 functionality or Zhang only does one thing. This

1 is -- I'm not saying. I'm going block by block,
2 trying to understand what you contend each element
3 does and how they're connected together so we can
4 build up on that.
5 So my question is, based on what you
6 explained in Zhang's Figure 2, is it your opinion
7 that it is not the selector 240 in Zhang that
8 selects channels from the digitized RF signal
9 output from AD Converter 220?
10 ATTORNEY QUALEY: Objection to form.
11 THE WITNESS: The C1 through Cn are
12 selected by 230. And the D1 through Dm are
13 selected by 240.
14 BY ATTORNEY HENDIFAR:
15 Q Let me try it this way: C1 through Cn
16 are demultiplexed from the digitized input signal
17 from 220; correct?
18 A No. It's like -- it's like Figure 3.
19 It's like -- the inside of 2 -- 230, one
20 embodiment is shown in Figure 3.
21 Q Right.
22 A So there's a -- there's a complex mixer,
23 low-pass filter, NCO. There's multiple of those
24 chains of those three elements, right. And each
25 one of them can tune a particular channel or

1 select a particular channel from the full RF
2 input, which is digitized from analog-to-digital
3 converter. And each one of those C1 through Cn
4 can tune a different one of those channels. And
5 then -- then those are forwarded to the n×m
6 selector that can switch those to different places
7 in different ways as described and we've been
8 talking about.
9 Q Wonderful. So let's take that step by --
10 I don't disagree with how you described Zhang to
11 work. But I just don't know if I have a clear
12 answer to my question. So I'll take it step by
13 step. There is an RF input signal in Zhang's
14 Figure 2; correct?
15 A Yes.
16 Q And that RF input signal is converted to
17 digital signal in the AD converter 220; correct?
18 A Yes.
19 Q And Zhang's digital channel DeMux 230
20 demultiplexers channels C1 through Cn from the
21 digitized input signal; correct?
22 A That's right.
23 Q And the selector 240 selects some or all
24 of those channel C1 through Cn and outputs them as
25 D1 through Dm; correct?

A That's right.
Q So the selector 240, in your opinion, does not select any channels from the digitized input signal from 220; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: I mean, it does because you would have to select the desired channel D1 through Dm in the n×m selector to use it, to output to a demodulator.
BY ATTORNEY HENDIFAR:
Q Sure. But that selection is done from channel C1 through Cn, aren't they? Did I misunderstand your explanation?
A That's right.
Q So maybe that's -- I'm not asking if the selector 240 does selection. Obviously it does. I'm not asking whether it outputs desired channels, as you phrase it, D1 through Dm. Obviously it does. I'm asking where the selector 240 selects from. So my question is, in your opinion, the way you explained Zhang to me, in Zhang's Figure 2, the selector 240 does not select from the digitized input signal from AD 220; correct?
ATTORNEY QUALEY: Objection to form.

THE WITNESS: You lost me. I didn't understand that last part.
BY ATTORNEY HENDIFAR:
Q Then I'll -- I'll repeat it again. Not a problem.
I don't disagree with you that selector 240 selects some channels. And I don't disagree with you that it sends out desired channels D1 through Dm to demodulators. I'm trying to ascertain where the selector 240 selects channels D1 through Dm from. So my question is, in Zhang's Figure 2, in your opinion, the way you explained Zhang works here, the selector 240 does not select channels D1 through Dm from the digitized input signal output by box 220; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: It selects from digitized signals.
BY ATTORNEY HENDIFAR:
Q What digital signals? I'm sorry.
A So these two blocks work together. They accomplish a functionality of selecting desired channels to output to demodulators. And this is one embodiment as shown in Zhang. I'm not sure that he's describing all the embodiments which

could represent this functionality. The point he's trying to make is that we're selecting channels and we're outputting the demodulators.
Q No dispute. That -- I'm not disputing any of what you're saying. My question is at least the embodiment that Zhang does disclose in Figure 2, I want to understand each module does which selection. So -- because obviously the different modules have different functionalities. I understand that the collective result is that you have desired channels output to demodulators. I understand that.
My question is, I am trying to understand where selector 240 selects from. So I'll repeat my question. And I do request that this time you try to answer it directly. I understand that you're going through a declaration. I don't know if this question is in your declaration. So please focus on my question and answer my question.
In Zhang's Figure 2, based on how you explained in the embodiments that are shown Figure 2 works, selector 240 does not select channels D1 through Dm from the digitized RF signal output from the AD converter 220; correct?

ATTORNEY QUALEY: Objection to form.
BY ATTORNEY HENDIFAR:
Q I'm sorry. Are you reviewing some document?
A Yes.
Q Would you please -- and I don't mind if you review. But this is a remote deposition. I cannot see. Let us know what you are reviewing.
A I'm looking at the Zhang reference.
Q You're looking at what? I'm sorry.
A The Zhang reference.
Q Oh. Okay. So I'll repeat the question again so it is pending and you can think about it. The question is in Zhang's Figure 2 in the embodiment that is shown in Zhang in how Figure 2 operates, the selector 240 does not select channels D1 through Dm from the digitized input signal that is output by the AD converter 220; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: Can you ask -- read that question back, please?
BY ATTORNEY HENDIFAR:
Q Of course. In Zhang's Figure 2, the way the embodiments that are, in fact, shown in

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1 Zhang -- I understand that Zhang is flexible and
2 all this. But the embodiments that are actually
3 shown in Zhang, in Zhang's Figure 2, the selector
4 240 does not select channels D1 through Dm from
5 the digitized input signal output by the AD
6 converter 220; correct?
7 ATTORNEY QUALEY: I said objection to
8 form. I'm not seeing it.
9 THE WITNESS: So if you look at just
10 Figure 2 of Zhang, there's not a line going from
11 220 to 240. But Zhang goes on to say that it is
12 to be understood that the implementations of
13 Figures 2 through 6 are merely examples and should
14 not limit the scope of the claims herein. So the
15 way I read that is it could have a line that goes
16 from the analog-to-digital converter 220 to the
17 selector 240. And furthermore, if you had a
18 system with, let's call it, a few channels, and
19 you wanted to demodulate an output just a few
20 channels and you wanted to select all of those
21 digital channels -- or even you could say if you
22 wanted to output all of those channels that are
23 out of the high-speed analog-to-digital converter,
24 you could. Zhang allows that. So -- so one could
25 have essentially -- let's pick an example. Say I

1 have a hundred channels coming in. I could have a
2 hundred C elements, C1 through C100, right. And I
3 could have a hundred D elements, D1 through D100,
4 and output all of them. So in effect, the output
5 from the A-to-D converter in that instance would
6 be directly going to the channel selector, n×m
7 channel selector. And that's an example that
8 should not limit the scope of the claims and to be
9 understood that the implication are merely of
10 the -- of figures 2 through 6 are merely examples.
11 BY ATTORNEY HENDIFAR:
12 Q Okay. I want to ask my question about
13 the Figure 2 to 6. Not what could be done. Not
14 what the modification could be. Not what the
15 general teaching can be expanded to. I'm
16 specifically -- not just even 2 to 6. I'm
17 specifically asking from -- about Figures 2 to 5.
18 Specifically those figures. Not what could be
19 done in modifying those figures. Not -- nothing
20 like that. My question is, in Zhang's embodiments
21 of Figure 2 to 5 -- embodiments of Figures 2 to 5
22 in Zhang, the selector 240, in your opinion, based
23 on how you explained it works, does not select
24 channels D1 through Dm from the digitized RF
25 signal output from the AD converters 220; correct?

1 ATTORNEY QUALEY: Objection to form.
2 THE WITNESS: I think I answered.
3 BY ATTORNEY HENDIFAR:
4 Q What you answered was Zhang doesn't limit
5 even in these embodiments. Zhang is general. You
6 could do it. Again, I'm not asking --
7 A I'm quoting from Zhang.
8 Q Yes. But you're saying that Zhang
9 embodiments were exemplary and not limiting. So,
10 again, I'm not asking about general what could be
11 expanded to. I'm asking specifically about
12 Figures 2 to 5. Embodiments of Figures 2 to 5.
13 Do you understand the distinction between asking
14 about actual embodiments and alternatively what
15 could be done with those embodiments by modifying
16 them or implementing them differently? Do you
17 understand that distinction?
18 A I think I do.
19 Q So my question is not about all the
20 possible ways Zhang can be implemented based on
21 this general. That's not my question. My
22 question is, in Zhang's embodiment of Figures 2 to
23 5 -- in Zhang's embodiments of Figures 2 to 5, in
24 your opinion, based on what you explained to me,
25 the selector 240 does not select channels D1

1 through Dm from the digitized input signal from
2 the AD converter 220; correct?
3 ATTORNEY QUALEY: Objection to form.
4 THE WITNESS: It does via the digital
5 channel DeMux 230.
6 BY ATTORNEY HENDIFAR:
7 Q Okay. That was not hard. So you
8 testified that you don't see what you call the
9 direct line from the selector 240 to the AD
10 converter 220 in Figure 2; correct?
11 A That's right.
12 Q You don't dispute that digital channel
13 DeMux 230 is coupled to the AD converter 220, do
14 you?
15 A No.
16 Q And you don't dispute that selector 240
17 is coupled to the converter 220, do you?
18 A No.
19 Q Is it your opinion that selector 240 is
20 coupled to the AD Converter 220?
21 A Yes. Via channel -- digital channel
22 DeMux 230.
23 Q Now, you testified that channels C1
24 through Cn is a subset of all of the -- of
25 frequencies downconverted in block 210 and

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1 digitized in block 220. Do you recall that?
2 ATTORNEY QUALEY: Objection to form.
3 THE WITNESS: I'm not sure that's what I
4 said. Do you want to try that slowly, maybe piece
5 by piece?
6 BY ATTORNEY HENDIFAR:
7 Q Sure. Do you recall testifying that
8 channels C1 through Cn are a subset of the -- let
9 me step back. I withdraw this question.
10 I think apart from Zhang, where is the
11 logic that determines which channel C1 through Cn
12 goes to which data bus 1 through K?
13 A I don't think Zhang shows the logic. He
14 shows just some of the capabilities of these two
15 blocks.
16 Q And where would that logic be located,
17 even if Zhang does not show it?
18 A I haven't thought about that. I haven't
19 rendered an opinion on that.
20 Q Okay.
21 A If I have, please let me know, and I'll
22 answer a question about it.
23 Q Now, in Zhang Figure 2, the output of the
24 n×m selector is D1 through Dm. Do you see that?
25 A Yes, in Figure 2.

1 Q In Figure 5, the output of the selector
2 is three lines each, one having D1 through Dm. Do
3 you see that?
4 ATTORNEY QUALEY: Objection to form.
5 THE WITNESS: I mean, I see three lines,
6 D1 through Dm; another three lines, D1 through Dm;
7 and another three lines, D1 through Dm.
8 BY ATTORNEY HENDIFAR:
9 Q Correct. How do you reconcile the output
10 of selectors shown in Zhang Figure 5 with the
11 output of the selectors shown in Zhang Figure 2?
12 A So according to paragraph 38 of Zhang,
13 Figure 5 is a simplified high-level schematic
14 diagram of an n×m digital selector 500 that can be
15 used to implement digital selector 240 of
16 Figure 2.
17 Q Does that conclude your response?
18 A Yes.
19 Q That was not -- that didn't answer my
20 question. My question was, how do you
21 reconcile -- well, let me step back.
22 You just read from paragraph 38 of Zhang
23 showing or stating Figure 5 is an implementation
24 of the selector in Figure 2. Do you recall that?
25 A It is an implementation of selector 240

1 in Figure 2, yes.
2 Q How do you reconcile Figure 5's output of
3 the selector shown as three lines each having D1
4 through Dm, with Figure 2 showing the output of
5 the selector just D1 through Dm?
6 A So Zhang is just illustrating and I think
7 talking about the flexibility of the data buses
8 when he's talking about Figure 5. So, you know,
9 one could -- you know, a POSITA would see D1 and
10 D1 and D1, and he would think, oh, you know, they
11 could be connected together, right. But what
12 we're also saying is that -- that -- scratch that.
13 What -- I think what I started to say and I did
14 say is the flex- -- he is trying to describe the
15 flexibility of the data buses in Figure 5. So he
16 is basically saying any data bus can be routed to
17 any demodulator.
18 Q In Zhang's Figure 2, would each of those
19 bus lines K go to a demodulator 250?
20 ATTORNEY QUALEY: Objection to form.
21 THE WITNESS: As shown in Figure 5, the
22 data bus Ks go through data bus 1 through Ks go
23 to the block 530, which then output to the
24 demodulators. Again, this is not a schematic
25 diagram. This is a functional illustration of

1 these blocks.
2 BY ATTORNEY HENDIFAR:
3 Q Sure. And I'm -- me not being the
4 expert, I'm trying to superimpose Figure 5 in
5 Zhang in Figure 2 to see how the bus lines K
6 relate to lines D1 through Dm and the demodulators
7 250 shown in Figure 2.
8 A So, again, as I read, 2 -- Figure 5,
9 which includes box 510 and 530 are representative
10 an embodiment of the functionality of box 240 of
11 Figure 2. So just take Figure 5 and put it inside
12 the box of 240 as one implementation example.
13 And, again, what he was talking about in Figure 5
14 and why he was drawing Figure 5 the way he did was
15 showing the flexibility of this design. Yeah.
16 Q So putting Figure 5 into the selector 240
17 of Figure 2?
18 A Right.
19 Q So there would be a bus selector, a data
20 bus, and a time division DeMux all within 240;
21 correct?
22 A That's right.
23 Q Okay.
24 A Although the functionality he discusses,
25 time division DeMux, it does a lot more than that.

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Q What does it do?
A It's a very flexible switch that lets you route data from any of the data bus Ks to any of the outputs.
Q Does it actually do any demultiplexing?
A I'm not sure it is disclosed by Zhang which box within that does demultiplexing. But I think it can do that. Again, he doesn't describe -- he doesn't show a block diagram. I'm sorry. He doesn't show a schematic. What he indicates is that this n×m selector is very flexible. And can do a lot of things, many of whom match exactly to the claim elements of the patents that we've been talking about.
Q Right. So going back to superimposition of Figure 5, I'm putting it inside of the selector 240 of Figure 2, the confusion I have is selector 240 on Figure 2 shows at the output of the selector D1 through Dm. But the selector of Figure 5 shows at the output of the selector three sets of D1 through Dm. And I don't know how the superimposition works. If you can maybe guide me through it.
A So as I state in paragraph 121 of my declaration, Zhang discloses digital selector 240

is configured to output the digital data stream with its bus selector 510, which receives channel C1 through Cn and sends the channels across one or more clocked data buses. So one or more includes one. And diagram -- and Figure 2 shows less of more than Figure 5 does. That this can do -- the output of this can be one or more buses.
Q I see. So what is shown in Figure 2 is just one of those buses?
A Well, it's showing D1, D2, Dm. It doesn't show multiple D1s, multiple D2s, and multiple Dms.
Q I see. So what Figure 2 is showing is, in view of Figure 5, one bus internal to the selector 240 which outputs D1 through Dm to demodulators 250 1 through m; correct?
A That's right.
Q I see. And I appreciate that. That's actually very helpful to me. So in Figure 2 --
A Just to be clear, data bus 1 in Figure 5 could output D1. Data bus 2 could output D2. And data bus K could output D -- Dm.
ATTORNEY QUALEY: Any chance we have a break coming up?
ATTORNEY HENDIFAR: Sure. Let's take a

break now. That's fine. How long?
ATTORNEY QUALEY: Just ten minutes.
ATTORNEY HENDIFAR: Ten minutes. Come back at 15 minutes past the hour.
ATTORNEY QUALEY: Thank you.
ATTORNEY HENDIFAR: Thank you.
(A recess was taken.)
BY ATTORNEY HENDIFAR:
Q So, Mr. Lett, in paragraph 29 of Zhang, it states that that lower case letter m is the number of demodulators; correct?
A Sure. Yes.
Q Is there a relationship between the number K of data buses and number m of the demodulators?
A I don't think Zhang discloses that. So I'm not sure.
Q In your opinion, can the number of data buses K be more than the number of demodulators m?
A I'm not sure. I didn't render an opinion on that. I need to think about it.
Q Do you have -- sorry. I didn't mean to interrupt you.
A I mean, that's a new opinion that I would rather not on the fly.

Q Do you have any opinion as to what determines the number of data buses K?
A I don't really feel comfortable answering that because I don't think that I rendered an opinion on that.
Q Right. You haven't rendered an opinion. But do you have an opinion?
A I would rather not come up with new opinions. If it is in my declaration, I'll be glad to answer questions about it.
Q So sitting here now, you have -- you have no idea what determines the number of data buses K in Zhang's Figure 5; is that correct?
A I'm not prepared to invent new evidence on the fly in this deposition.
Q I'm sorry. That doesn't answer my question. The question is, sitting here now, you have no idea what determines the number of data buses K in Zhang; correct?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: I don't think I rendered an opinion on that, so I'm not prepared to render that new opinion at this point.
BY ATTORNEY HENDIFAR:
Q Going back to the same issue of you not

1 wanting to say something that is not already in
2 your declaration. Whether or not something is in
3 your declaration, that doesn't determine what I am
4 allowed to ask you. So either you have an idea or
5 you have no idea. It's one or the other.
6 So the question is, sitting here now, is
7 it the case that you have no idea what determines
8 the number of data buses K in Zhang's Figure 5?
9 ATTORNEY QUALEY: Objection to form.
10 THE WITNESS: I have not thought about
11 that thoroughly. I would not like to render a new
12 opinion on that at this point.
13 BY ATTORNEY HENDIFAR:
14 Q Okay. Are you able to speculate?
15 A I suppose I could speculate.
16 Q Okay. What is your speculation as to
17 what determines the number of data buses K in
18 Zhang's Figure 5?
19 A The particular application that you're
20 designing the system for, one might want to have
21 more or less data buses depending on the number
22 of -- the amount of throughput that is needed
23 and -- and the flexibility of the architecture and
24 the number of inputs to this element C, C1 through
25 n, the number n might have a factor on it. And

1 also what flexibility you desire on the output as
2 shown in Figure 5 might have some bearing on it.
3 So there's lots of variations that could be --
4 again, I'm just speculating. I haven't thought
5 about it. And so I don't render this as part of
6 the record, other than just speculation.
7 Q I understand. Now, why would -- and I
8 understand that you're not speculating. That's
9 fine.
10 Why would Zhang combine channels C1 to Cn
11 in a bus and then demultiplexes them before
12 sending it out of the selector instead of directly
13 just redirecting channels C1 through Cn?
14 Strike that. Let me rephrase the
15 question.
16 So what is shown in Zhang's Figure 5, as
17 far as I can tell, is that a number of individual
18 channels go in and then a number of individual
19 channels go out. And in -- are you able to
20 speculate as to why in Zhang Figure 5 the
21 individual channels are combined into buses and
22 then demultiplexed to individual channels before
23 being sent out as opposed to not using a bus and
24 just sending individual channels out to the
25 selector from the selector as necessary?

1 A That was a pretty long question. Would
2 you mind breaking it down for me?
3 Q Of course. May I please refer you to
4 Zhang Figure 5.
5 A Okay.
6 Q Do you see that a number of channels C1
7 through Cn enter the selector; correct?
8 A Yes.
9 Q And do you see a number of individual
10 channels D1 through Dm, D1 through Dm, and D1
11 through Dm go out of the selector; correct?
12 A It is out of the time division DeMux in
13 Figure 5, the D1 through Dm.
14 Q Right. And that is what goes out of the
15 selector in Figure 5; correct?
16 A Well, Figure 5 says bus selector on the
17 left side and time division DeMux on the right.
18 So D1 through Dm come out of the time division
19 DeMux in Figure 5.
20 Q I see. So do you believe that in
21 paragraph 38 of Zhang, where it says the digital
22 selector 500 includes the time division
23 demultiplexer 530, do you think that is a typo?
24 A What paragraph was that?
25 Q 38 of Zhang.

1 A It says, "Digital selector 500 includes a
2 bus selector 510, one or more multi data buses
3 520, and a time division demultiplexer 530."
4 Q Yes. Thank you. Do you think it is a
5 typo when Zhang in paragraph 38 says that the
6 digital selector 500 includes among other things a
7 time division demultiplexer 530?
8 A I have no reason to believe that it is a
9 typo.
10 Q Okay. So going back to Figure 5,
11 wouldn't it be the case that the time division
12 DeMux 530 would be a part of the selector 240?
13 A So, again, this is one embodiment.
14 Q Right. This embodiment.
15 A Figure of -- in the n×m selector 240, as
16 shown in Figure 5.
17 Q Right. So in the embodiment of Figure 5,
18 the time division DeMux 530 is a part of the
19 selector; correct?
20 A Well, the selector is called n×m selector
21 240.
22 Q Correct.
23 A That's -- so, again, the n×m selector
24 240, a block diagram simply identified block
25 dramas Zhang explains is shown in Figure 5.

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Q I'm not disagreeing with that. I'm saying do I understand correctly then in Zhang's Figure 5, the time division DeMux 530 is a part of that n×m selector?
A That's -- that's correct.
Q That's all I'm asking. I'm not trying to challenge you. I'm just trying to establish the basics.
A Yeah. You were confusing me because you were changing the name of box 240.
Q I'm sorry. I didn't mean to do that.
A Okay.
Q So in Zhang's Figure 5, what comes out of the n×m selector is a number of individual channels, D1 through Dm; correct?
A In the demodulator, yes.
Q In Figure 5, we have a selector where a number of individual channels go in, but a number of individual channels go out in Figure 5 as shown; correct?
A Well, when you say going out, are you referring to D1 through Dm?
Q Correct.
A Yes, that's right.
Q So my question is -- and this is in part

for the long question that I ask. Are you able to speculate as to why in Zhang's Figure 5, instead of directly sending out some of the channels C1 through Cn out of the selector n×m selector, why is there a data bus to combine some channels and then a DeMux to separate out those same channels and then send out individual channels from the selector? Do you understand my question?
A Yeah.
Q Thank you.
A So in paragraph 39, it says because a bus clock is much faster than the channel sampling rate. Each bus can be used by multiple RF channels with the use of time division multiplexing, which occurs before the selected RF channels enter the data buses.
Q Right. But don't the channels of the data buses have to be demultiplexed before they are sent out of the n×m selector?
A No. As I showed earlier and explained earlier with the annotated Figure 5, the time division multiplex can go from, you know, C1 to data bus 1 to D1, and it is still time division multiplexed.
Q I see. So in --

A Serial output to the demodulators.
Q So in your opinion, Figure 5 would have a scenario where, for example, data bus 1 is directly sent out to a specific user or demodulator without being demultiplexed?
A That's one capability. And that's the one that I showed in the diagram I just mentioned.
Q I understand. And -- okay. And that's where the data bus having a higher speed has the benefit because multiple channels are going through the same demodulator and the same data bus?
A Well, yeah, the time division multiplexing with the faster channel rate allows the output of the multiplex data stream to the demodulator.
Q I understand. I appreciate that explanation.
Going to Figure 8 of Zhang. I'm not going to ask block-by-block question. But if it is easier for you, I'm going to eventually get an explanation of what Figure 8 and each box in Figure 8 does. Are you more comfortable me asking you box by box or would you be more comfortable just explaining what Figure 8 does in different

portions?
A I don't know. Let's try one. If it doesn't work, we'll try the other.
Q Which one would you like to try first?
A So -- I mean, let me just read what Figure 8 does in the paragraph 22 of Zhang. It is a simplified high-level block diagram of a system using exemplary multi-channel demodulator according to the embodiment of the present invention.
Q For your convenience, it is discussed in paragraph 45 of Zhang, if that helps. So is -- in Figure 8, is box 810 the same system shown in Figure 2 of Zhang?
A I didn't really look at that as part of my declaration. What I used Figure 8 for was disclosing that Zhang describes the -- and I'm looking at paragraph 79 of my declaration -- describes a multi-channel demodulator circuit that can be used as advanced wideband front end for its digitial -- for digital set-top boxes, PVRs, home gateways, and home media centers. And I -- and that's the reason that I cited that section 44 through 45 was for that quote. And if you look at Figure 5, you can see it's got a PVR.

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Q What is --
A A PVR.
Q What is a PVR?
A A PVR and DVR are used. Digital video recorder. Personal video recorder.
Q Now, in Zhang's Figure 8, do you know what the box denotes?
A I didn't look at that much. I was just disclosing the fact that Zhang discloses that this -- the advanced wideband front end discloses a DVR functionality. So I'll have to study that.
Q What is a TS Parse in Zhang's Figure 8?
A I didn't study Figure 8, so I can try to read the Zhang and figure it out, I guess.
Q As an expert, do you recognize the phrase TS Parse in Zhang's Figure 8?
A I mean, it -- it may be TS, transport stream parsing. But I'm not sure. I would probably need to read the text.
Q I'm sorry. Sure. If you need whatever you need to read, and then I'll ask you the question.
A Okay. Thank you.
Q Sure. My goal is not to trick you. So read whatever you need to read. Just let me know

what you're reading and please let me know when you're ready so I can ask you the question.
A I'm looking at Zhang -- the Zhang reference.
Yeah. I don't think he -- I don't think he describes Parse. TS Parse. I could be wrong. But I don't see it. Perhaps if you see it, you can point me to it and maybe I can read it.
Q I would if I did.
As an expert in the field, what is a transport stream parser?
A I didn't -- I don't think I rendered an opinion on that. And so I don't feel like I need to come up with a new -- new opinions.
Q Do you -- okay. Have you heard of the phrase transport stream parser before?
A Yes.
Q What does it mean?
A Well, what I don't understand is how Zhang is using it. So I want -- and then there's no disclosure that I can find in Zhang of TS Parse other than that one phrase. So I would like to be accurate in my answer. And I haven't thought about that. So I would rather not answer because that is a new opinion that I did not render in my

declaration.
Q We're back to the same point. You testified that you have heard the phrase TS Parse before; correct?
A Well, I'm the one that said that's probably what it means.
Q Very good. So what is your understanding as an expert in the field as to what a transport stream parser means?
A So what I don't know is how is Zhang using that phrase or functionality. It's possible that it could be something different than what I would consider in particular use case. So I would rather not speculate as to what he means by TS Parse.
Q So if I walk up to you in the street and said the phrase transport stream parser, you have no idea what that means? Is that your testimony?
A I'm not supposed to judge, but I would think you were pretty weird.
Q Nonetheless, you have no idea what a transport stream parser is?
A I have heard the term. I've seen the term in designs. I generally understand in my designs that I worked on what it would mean. But

what I don't understand is what is Zhang using the term for.
Q In your designs, what did transport stream parser mean?
A It's taking a data stream as a transport stream and breaking it up into its component parts.
Q Component parts in the sense that separating out different content channels?
A It could be. Right. Or it could be audio and video and, you know, alternate data streams and alternate audios and those kinds of things. It is essentially taking all of the different elementary streams that are within a transport stream and, you know, breaking them up separately so that you could process them accordingly.
Q Okay.
A Those are my designs. I'm speculating why Zhang uses that. I do not know why Zhang is using that term.
Q Okay. Now, same question about CA System. Do you have any speculation on what the phrase CA System means in Zhang's Figure 8?
A Conditional Access System.

1 Q Okay.
2 A And Zhang probably doesn't explain what
3 he means by that either.
4 Q No. What was that phrase? Conditional
5 Access System?
6 A Right.
7 Q Is that, for instance --
8 A It would be basically --
9 Q [Cross-talking] basically?
10 A In my designs of set-top box, not in
11 Zhang's designs, right, Conditional Access System
12 would be the system that is responsible for
13 determining if a subscriber was authorized to
14 watch a particular channel. That's one example of
15 what a CA System does. Like if I didn't pay for
16 HBO, and therefore I can't watch HBO per the
17 conditional access system. But if I did pay for
18 HBO, I could watch HBO per the conditional access
19 system.
20 Q Thank you. What is a DMA in Zhang's
21 Figure 8?
22 A It could be -- I'm not sure. I'm not
23 sure what he's -- what he's using that for. Does
24 he use the term in the patent?
25 Q Not that I have seen. Do you have -- you

1 have no speculation?
2 A I mean, DMA is used for Direct Memory
3 Access. I mean, it could be other things, though.
4 I don't know if it is that or not in this diagram.
5 Q Okay.
6 A Perhaps it is something else. I don't
7 know.
8 Q Okay. May I please refer you to IPR
9 2024-00435, Exhibit 1002, which is your
10 declaration.
11 A Okay. Thank you.
12 ATTORNEY QUALEY: I'm sorry. Which
13 patent is that one for?
14 THE WITNESS: '362. The '362
15 declaration.
16 ATTORNEY HENDIFAR: No. No. The
17 2024-00435. That is the IPR number.
18 ATTORNEY BLAIR: I believe that is the
19 '866.
20 ATTORNEY QUALEY: Thank you.
21 THE WITNESS: I'm sorry. My electronic
22 folder just crashed. Let me pull it back up
23 again. And the exhibit number is what?
24 BY ATTORNEY HENDIFAR:
25 Q 1002, your declaration.

1 A Okay. Okay. I have it.
2 Q Would you please go to page 53 of your
3 declaration 1002 in IPR 2024-00435.
4 A I'm sorry. What page number?
5 Q 53.
6 A Okay.
7 Q Do you see the annotation that you have
8 made comparing Figure 2 of Zhang to Figure 6 of
9 the patent -- I'm not sure which number it is, but
10 the patent being challenged?
11 A Yes. The '866 in this case.
12 Q Did you prepare this annotation?
13 A I think I edited it. I may not have
14 prepared the original version of it.
15 Q Did you determine which box corresponds
16 to which box?
17 A I may or may not have. But I agree with
18 the -- with the annotations.
19 Q Do you see that in the red boxes, you
20 have mapped the frequency-block downconverter to
21 10 in Zhang to the radio front end in the '866
22 patent Figure 6?
23 A That's right.
24 Q Do you also see that you have mapped in
25 the yellow boxes the analog digital converter 220

1 in Zhang to the analog digital converters 218 and
2 228 in the '866 patent?
3 A Yes.
4 Q And do you see that you have mapped in
5 purple the mixers in Figure 2 of Zhang to the
6 mixers in Figure 6 of the '866 patent?
7 A I think it says Figure 3 of Zhang.
8 Q I'm sorry. Figure 3 of Zhang. You're
9 right.
10 Now, why did you map the low-pass filters
11 330 in Figure 3 of Zhang to the boxes that you
12 have annotated in green 260 in Figure 6 of the
13 '866 patent?
14 A Because those are low-pass filters as
15 part of the channel selection.
16 Q Now, why did you map in purple the n×m
17 selector 240 in Zhang to the output of the Digital
18 Front End DFE arrow titled serial or parallel to
19 demodulator in Figure 6 of the '866 patent?
20 A Because the n×m selector outputs serial
21 or parallel interface to a demodulator.
22 Q That's the one that you said is like a
23 switch; right?
24 A Among other things. It's got a lot of
25 functionality, as we've been through.

Q Okay. Why didn't you map the n×m selector 240 in Zhang to the output of filters 260 within the digital front end in Figure 6 of the '866 patent?
A Because I pull in another reference that would be obvious to a POSITA to include a decimator in one of the grounds.
Q What is the basis of your opinion that the n×m selector 240 in Zhang is analogous to the output of the digital front end 230 in the '866 patent Figure 6?
A I'm sorry. Can you repeat that a little slower? I missed a couple of words.
Q No worries.
What is the basis of your opinion that the n×m Selector 240 in Zhang is analogous to the output of the digital front end 230 in Figure 6 of the '866 patent?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: As we've been talking about -- and we can go through it in more detail if you want -- the n×m selector -- n×m selector can output serial or parallel data to a demodulator.

BY ATTORNEY HENDIFAR:
Q Is that it?
A Yes.
Q So in your opinion, would it be wrong to map the n×m selector 240 from Zhang to the output of filters 260 within the digital front end in Figure 6 of the '866 patent?
A Well, the output of the Figure 6 annotated below is on the right side. And what we're mapping to is the output to demodulators. So it is more logical to map that to the output. And then we come along later and explain the decimation.
Q I see. So you're mapping --
A This is the overview section of my -- of my declaration. And we get into a lot more detail further on in the declaration about these elements.
Q So you're map- -- and I understand. But I want to understand the logic before we go further. So you're mapping the n×m selector 240 in Zhang to the output of the digital front end 230 in Figure 6 of '866 patent because the selector is basically a bus selector that is similar to the output of the digital front end

being sent to the demodulator?
Are you searching something?
A I'm looking at my declaration.
Q I can break down the question if that is easier for you.
A I'm going to find the answer for you in a way to explain it thoroughly.
Q It's been a couple minutes. I'll come back to this question since you're looking still.
What is a bus selector?
A Do you see that somewhere?
Q You previously told me that in the selector 240, the first box is on the bus selector. Yeah, Figure 5 of Zhang, actually. The first box is called the bus selector.
A Okay. What's your question?
Q What is a bus selector?
A Well, as Zhang describes, Figure 5 and all the details about 510, that describes a bus selector.
Q Okay.
A Do you want me to -- do you want me to find what Zhang says about that?
Q Zhang actually doesn't say much. So have you heard of the term bus selector outside of this

IPR?
A I don't think I have. I wouldn't think that is like a normal kind of industry term.
Q Well, what would the industry term be for a circuit that selects buses?
A I don't know.
Q Okay.
A I'm okay with that term. But I -- I wouldn't commonly use that, I don't think.
Q I see. Okay. So do you have an opinion on what a bus selector is in Zhang?
A Well, as we've been through the discussion on Figure 5, you know, it describes some functionality. Like one is time division multiplexing, which occurs before the selected RF channels enter the data buses as per paragraph 39 of Zhang. So it seems like the bus selector includes a time division multiplexing capability. And it also seems like it can route the signals C1 through Cn in any way -- a very flexible way to any of the data buses.
Q So is the bus selector in Zhang Figure 5 essentially a funnel?
A I don't know what that means. I don't understand that.

Q Okay. Do you know what a funnel is?
A I know what a funnel is when I put oil in my car.
Q Is the bus selector in Zhang's Figure 5 basically a switchboard that routes different channels to different buses?
A It can do that. A switchboard -- I would say a very flexible switch that can switch from any input to -- to any of the outputs. So, like, you know, you can see the lines. C1 can go to data bus 1, data bus 2, and data bus 3. And then also as paragraph 39 says, it seems like the bus selector includes a time division multiplexing, which occurs before the selected RF channels enter the data bus. So it sounds like it occurs in that box based on that disclosure.
Q Understood. Going back to page 53 of your declaration that we were just looking at. Do you still have that?
A Let's see. We're talking about the '866, is it?
Q The '435 IPR, yes.
A No.
Q Please let me know when you have it.
A Okay. I have it.

Q Do you see in Figure 6 of the '866 patent the arrow titled serial or parallel data interface to demodulator with the orange box that you have drawn around it? Do you see that?
A What page are you looking at?
Q Page 53 of your declaration. The one that we were looking at a few moments ago.
A Yeah. I'm sorry. I just lost it momentarily. So I'm having to come back to it. Okay. I'm on page 53.
Q Now, do you see the annotation that you have made that we have discussed before, Figure 6 of the '866 patent, the orange box that you have drawn around the arrow titled serial or parallel data interface to demodulator. Do you see that?
A Yes.
Q That arrow says that the data can be either serial or parallel; right?
A That's rye.
Q In Figure 6 of the '866 patent, there would be something analogous to a switchboard that would extend the data output from the digital front end to one or more demodulators; correct?
A I don't know. I don't know if he discloses that.

Q Okay.
A Zhang's design is much more flexible, as I indicated, that discloses all of the claim elements of the '866, as well as -- well, the ones that I mentioned in my declaration -- in the grounds that I mentioned in my declaration, Zhang discloses all of those. And it also can do a lot more than what is in the '866.
Q Got it. So -- and that's fine. I'm trying to -- I've gone through all of the elements. This is the last one. So am I understanding you correctly that on page 53 of your declaration, you have mapped the n×m selector 240 from Zhang's Figure 2 to the output of the digital front end in Figure 6 of the '866 patent because it is the n×m selector that has the bus selector like a switchboard that determines which channel goes to which demodulator?
A Yeah. I don't think I used the word switchboard.
Q The bus selector.
A It uses -- it is a bus selector and the time division DeMux.
Q Right.
A It is -- it's the element, you know, 500

that includes both 510 and 530.
Q Okay. So because element 500 has the bus selector that determines which channel goes to which demodulator, you have mapped the n×m selector 240 in Zhang to the output of the digital front end in 230?
A Can you read that back slowly, please?
Q So am I understanding you correctly that because the n×m selector 240 in Zhang has the bus selector that determines which channel goes to which demodulator, and that's why you have mapped the n×m selector 240 to the output of the digital front end 230 in Figure 6 of the '866 patent? Is that the basis of why you have mapped those two elements as analogous?
ATTORNEY QUALEY: Objection to form.
BY ATTORNEY HENDIFAR:
Q Do you understand the question, Mr. Lett?
A The bus selector is element 510, according to Figure 5. And you're talking about the bus selector I think in a different way in your question. So therefore, I'm confused.
Q Is that because the n×m selector is the entirety of 500 not just the bus selector? Is that the base -- why you're confused?

A That's right.
Q Okay. So let me -- let me -- because my intention is not to confuse you. I just want to establish what element corresponds to what so we can go and discuss it.
So on page 53 of your declaration, is the reason why you have mapped the n×m selector 240 in its entirety to the output of the digital front end 230 is the reason that the n×m selector 240 determines which channel goes to which demodulator?
A Well, the element 500 is Zhang which includes the bus selector and the time division DeMux has the input C1 through Cn, which is the selected channels from the band that we're interested in, and outputs to one or more demodulators using serial or parallel interfaces. So this entire box 500 accomplishes a functionality, including time division multiplexing, that a POSITA would use for a serial interface to a multi-channel demodulator, for example. Among other things.
Q I'm sorry?
A Among other things.
Q May I please refer you to the '362

patent.
A Okay.
Q Okay. May I please refer you to Column 1, lines 27 to 29.
A Okay. I have it.
Q Do you see the sentence that says, quote, "Existing tuners for these applications down-convert a swath of channels to an intermediate frequency, which are then sent to a demodulator," end quote. Do you see that?
A I'm sorry. Starting with line 27?
Q Column 1, lines 27 to 29.
A I see that.
Q This column is talking about the '362 patent's prior art; correct?
A I don't know. It is in the background section of the patent.
Q Do you agree that in the '362 patent's prior art, in about April 2009, existing tuners would downconvert the swath of channels to an intermediate frequency, which was then sent to a demodulator?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: I don't know.

BY ATTORNEY HENDIFAR:
Q Okay. May I please refer you to Column 1, lines 41 to 45.
A Okay.
Q What does it mean to limit the dynamic range of the wideband tuner?
A So I think in general when you're talking about limiting the dynamic range, a signal may have a range of amplitudes. That is one thing. But to limit it, you would -- you would not -- you would actually have less than that full range or the higher range that could be if it was not limited.
Q So the dynamic range is referring to the amplitude of the signal?
A Well, yeah. Although, in the case of QAM demodulators, the dynamic range could be the phase also, I think. So it kind of depends. But -- but the point he is making here is that there's some limitation with wideband receiver that he's describing as a limitation.
Q And what is the limitation with wideband receivers that the patent is describing in Column 1, lines 45 through -- 41 to 45?
A It says the wideband receiver poses --

requirement poses a trade-off to the system to limit either the dynamic range of the wideband tuner or reduce the bandwidth covered by the tuner so that fewer channels may be received and processed by the demodulator.
Q Why was there a necessity for fewer channels to be received and processed by the demodulator?
A I'm not sure I know the answer.
Q In the '362 patent, same Column 1, lines 46 to 50, what is a direct conversion tuner?
A You know, I understand a direct conversion mixer. I would use probably the word, right, that would essentially downconvert the entire band in one step direct conversion to baseband. That's kind of an old classic architecture.
Q Didn't Zhang convert directly the entire frequency band?
A So Zhang uses a different architecture. Zhang uses a low-IF architecture with complex mixers. It's not a direct conversion.
Q So maybe I misunderstood. Did I misunderstood -- did I misunderstand that you said in Column 1, lines 46 to 50, on the patent, a

1 direct conversion tuner refers to the fact that
2 you directly downconvert the entire band to
3 baseband? Did I misunderstand that?
4 A Are you asking me about the '362 patent?
5 Q Yes. That's what we're reading. So do
6 you recall that we discussed the '362 patent,
7 Column 1, lines 46 to 50, where I asked you what
8 is a direct conversion tuner? Do you recall that?
9 A Yes.
10 Q Okay. And do you recall that you stated
11 that a direct conversion tuner is a tuner that
12 directly downconverts the entire frequency band to
13 baseband? Do you recall that?
14 A Yeah. But I am getting ready to tell you
15 the difference in what Zhang has.
16 Q So my question was not all the
17 differences between Zhang's Figure 2 and the '362
18 patent's Figure 1. My question was, if a direct
19 conversion tuner is a tuner that directly
20 downconverts the entire frequency band to
21 baseband, doesn't Zhang directly downconvert the
22 entire frequency band to baseband?
23 A Zhang is not a direct conversion. Zhang
24 uses an architecture as shown in paragraph 170 of
25 my declaration that uses complex mixers.

1 Q So --
2 A To generate an I and Q signal and a
3 low-IF receiver, double conversion wideband
4 receiver low-IF receiver, as I state in paragraph
5 171.
6 Q Okay. So I go back to my original
7 question. What is a direct conversion tuner?
8 A It is not what Zhang has.
9 Q Again, that's not the question. What is
10 a direct conversion tuner?
11 A So if you look at Exhibit 1018 --
12 Q Uh-huh.
13 A -- Figure 7.
14 Q Exhibit 1018 of?
15 A Oh, wait. Hang on. I'm sorry. I'm
16 wrong. That's not -- that's not the right figure.
17 So a direct conversion downconverts signal
18 directly to baseband and using use the I and Q
19 mixers.
20 Q What is the basis for your opinion?
21 A So if you look at Mirabbasi, which is
22 Exhibit 1018.
23 Q Which IPR?
24 A Exhibit 1018.
25 Q Which IPR?

1 A I think it is the same in all three.
2 Q Okay.
3 A We can look at '362. Exhibit 1018,
4 Mirabbasi.
5 Q Okay.
6 A Page 135. Under direct conversion
7 architecture.
8 Q Yes.
9 A Direct conversion also known as homodyne
10 or zero-IF conversion is a natural approach to
11 downconverting an RF signal directly to baseband.
12 Q Okay. So this doesn't say anything about
13 using quadrature or the I/Q signal, does it?
14 A That sentence does not.
15 Q Okay. So the question was -- well, let's
16 step back. Actually, in Figure -- so Figure 7 --
17 so in that same page 135 in Mirabbasi, that same
18 portion that you were reading under direct
19 conversion architecture, it references Exhibit 7
20 as an example; correct?
21 A This is an alternate architecture.
22 Alternately -- alternatively one can think of
23 choosing IF to be zero.
24 Q Okay. Is Figure 7 based on what
25 Mirabbasi says direct conversion architecture?

1 A No.
2 Q So even though Mirabbasi is discussing
3 Figure 7 under direct conversion architecture and
4 the title of Figure 7 is a generic homodyne
5 receiver and Mirabbasi says direct conversion is
6 also known as homodyne, it is your testimony
7 Mirabbasi's Figure 7 is not an example of direct
8 conversion architecture?
9 ATTORNEY QUALEY: Objection to form.
10 THE WITNESS: So -- so if you will
11 notice, Figure 7 does it all in one step, straight
12 to the DSP after one conversion, right. Whereas,
13 Figure 10, which is more -- is what Mirabbasi
14 uses, which is essentially the low-IF receiver,
15 you have a step that is the -- the front section
16 that has the complex mixers. And then it
17 digitizes with the ADC. And then there's the
18 channel selection with the four mixers and two
19 adders on the right side of Figure 10. That's
20 the -- this is the architecture that Zhang uses.
21 BY ATTORNEY HENDIFAR:
22 Q I'm not asking what architecture Zhang
23 uses. I asked you, what is the direct conversion
24 tuner? And let's start from the beginning. What
25 is a direct conversion tuner?

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1 ATTORNEY QUALEY: Objection to form.
2 THE WITNESS: There's essentially only
3 one step in the -- in the mixing and
4 downconverting, whereas Zhang uses the double
5 conversion as shown in Figure 10 of Mirabbasi.
6 BY ATTORNEY HENDIFAR:
7 Q When you said double conversion, what are
8 you referring to? Using I and Q mixers, a complex
9 mixer?
10 A As you can see in Figure 10, there's two
11 steps of conversion. The first step is, are the
12 two mixers, the I and Q mixers at the top and the
13 bottom on the left side. And then the mixers on
14 the right side with four mixers and two adders.
15 So the left side being the first conversion. The
16 right side being the second.
17 Q So Figure 10 of Mirabbasi, after the
18 first complex mixer with the two mixers, isn't the
19 signal at baseband?
20 A Well, which figure?
21 Q Figure 10 of Mirabbasi.
22 A Yes.
23 Q After the first complex mixer, which has
24 the I and Q mixers, is that the signal at
25 baseband?

1 A It can be.
2 Q Okay.
3 A Or it can be a low-IF.
4 Q Okay. So in Figure 10, the entire
5 bandwidth is directly downconverted to baseband in
6 one step; correct?
7 ATTORNEY QUALEY: Objection to form.
8 THE WITNESS: Well, the difference is
9 that the double -- the direct conversion is
10 outputting the channel that we're interested in in
11 one step, whereas this is downconverting to one
12 band and then selecting within that band, in
13 Figure 10.
14 BY ATTORNEY HENDIFAR:
15 Q If I may refer you to Figure 7 of
16 Mirabbasi. And please let me know when you're
17 there.
18 A I'm there.
19 Q What is the channel selection done in
20 Figure 7 of Mirabbasi?
21 A It is done by the -- by the selection of
22 the LO and the low-pass filters.
23 Q I see. So -- so is it your testimony
24 that Figure 7 of Mirabbasi brings to baseband just
25 a selected channel, not the entire bandwidth?

1 ATTORNEY QUALEY: Objection to form.
2 THE WITNESS: So perhaps if we looked at
3 paragraph 68 of my declaration, the '362
4 declaration, this will help. One could directly
5 downconvert the incoming RF signal to baseband in
6 the analog part of the RF receivers by using
7 quadrature downconverters, such as -- such that a
8 second downconversion stage is not needed before
9 the signals are forwarded to a demodulator; for
10 example, zero-IF receivers perform such direct
11 conversion. However, a significant problem in
12 direct downconversion is the introduction of
13 parasitic baseband signals at baseband, known as
14 DC-offset, in the output of the quadrature
15 downconverters. This DC-offset is mainly the
16 result of crosstalk between the incoming RF
17 signals and the complex signal of the quadrature
18 downconverters. The self-mixing phenomenon of the
19 oscillator producing the complex signal, the
20 leakage of the complex signals to the input of
21 LNA, and/or capacitive/inductive bondings between
22 the different components of the RF receivers.
23 Such DC-offset issues are not present in low-IF
24 receivers as the output of the first stage of
25 mixing is at IF and not at baseband, and the

1 downconversion at the second step is performed --
2 is digitally performed. Furthermore, in the
3 analog part of the RF receivers, mismatches
4 between the two components of the complex signal
5 and differences along the two branches of the
6 quadrature mixers and any following amplifiers and
7 filters can cause the corruption of the I/Q
8 components of the downconverted signals.
9 And this is basically describing the
10 architecture that is used by Zhang. The better
11 architecture.
12 BY ATTORNEY HENDIFAR:
13 Q So I asked you a question about Figure 7
14 of Mirabbasi. And after not answering my question
15 three times, you read a declaration -- a portion
16 of a -- a full page of a declaration about how
17 Zhang works? Is that your testimony?
18 A No. I read about direct conversions.
19 And that was in paragraph -- paragraph 68. And I
20 further went on to describe the better
21 architecture used by Zhang.
22 Q My question still stands. Thank you for
23 reading full page of a declaration.
24 My question is, is it your testimony that
25 in Figure 7 of Mirabbasi, the first complex mixer

which has the I and Q mixers downconverts only a single channel to baseband?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: The direct conversion as shown in Figure 7 can downconvert wider bandwidth than one channel. But it all does it in one step. And that was the point, as opposed to the two steps that is used by Zhang.
BY ATTORNEY HENDIFAR:
Q Now, going to the '362 patent, Column 1, lines 52 to 55.
A I'm sorry. Can we take a break?
ATTORNEY HENDIFAR: Sure.
THE WITNESS: I'm -- I need to use the restroom.
ATTORNEY HENDIFAR: How long of a break do you need?
THE WITNESS: Five minutes is fine.
ATTORNEY HENDIFAR: Sure. Let's come back at 40 minutes past the hour.
ATTORNEY QUALEY: Can we go off the record and then talk for a second?
ATTORNEY HENDIFAR: We're off the record.
(A recess was taken.)
ATTORNEY HENDIFAR: Let's go back on the

record.
Q So we were discussing a direct conversion tuner. Do you recall that?
A Yes.
Q And do you recall that you stated direct conversion tuner is one that directly converts the entire frequency band to baseband in one step? Do you recall that?
A I'm not sure that's what I said exactly.
Q Please correct me.
A I said that the -- the one could directly convert RF signal such that a second downconversion stage is not needed. In a direct conversion receiver. That's my testimony. Perhaps I misspoke. But that's my testimony.
Q How would you be able to select two channels in a direct conversion tuner?
A I haven't thought about direct conversion tuners in a long time, so I don't remember.
Q What is the low noise amplifier?
A It is an amplifier that doesn't have as much noise as one could have.
Q In Column 1, lines 46 to 50, of the '362 patent, what is the function of a low noise amplifier in a direct conversion tuner?

A I haven't thought about direct conversion tuners in a long time. So I don't -- I don't remember.
Q If I may refer you to the '362 patent, Column 1, lines 52 to 55. What is VHF?
A Column 1, what paragraph?
Q Sure. The '362 patent, Column 1, lines 52 to 55, what is VHF?
A Very high frequency, I think it stood for.
Q I'm sorry?
A Very high frequency, I think.
Q Okay. And what is UHF?
A Ultra-high frequency.
Q Okay. And is one satellite and one cable?
A This is talking about terrestrial broadcasting.
Q Okay. What does terrestrial broadcasting mean?
A Over the air, like with rabbit ears receiving television.
Q What is CATV?
A Cable TV.
Q Now, going down Column 1, line 60 to 62,

"Mixer M1 frequency downconverts the received RF input signal to a more convenient intermediate frequency band." Do you see that?
A Yes.
Q Why is intermediate frequency band more convenient?
A So according to paragraph 68 of my declaration, DC offset issues are not present in low-IF receivers as the output of the first stage of mixing is at IF and not at baseband. And the downconversion at the second step is digitally performed. And I'm citing Mirabbasi pages 9 and 10, and also Crols, which is Exhibit 1034 at 18.
Q Now, the paragraph that you read from your declaration compared a low-IF versus a baseband signal; correct?
A It compares a direct conversion to a low-IF.
Q Right. Direct conversion to baseband; correct?
A Right.
Q So the '362 patent, Column 1, line 60 to 62, the comparison is between intermediate frequency and RF frequency. Am I mistaken? And please let me know what document you're searching.

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A I'm looking at the '362 patent.
Okay. So what was the question?
Q The question was in the '362 patent, Column 1, lines 60 to 62, the comparison is between intermediate frequency and RF frequency, not baseband frequency; correct?
A That's right. In Figure 1 of the '362. The prior art.
Q So why is intermediate frequency more convenient?
A It doesn't say, I don't think, more convenient compared to what.
Q As an expert, do you have an opinion?
A I don't -- like I said, I haven't thought about direct conversion tuners in a long time. So I don't see a reason that he disclosed for that. Perhaps he did. And maybe if he did, you can point me to it.
Q Now, the '362 patent, Column 1, lines 62 to 64, what is the function of amplifier V1 in Figure 1?
A It says, "Tuner 100 includes an amplifier V1 having a programmable gain for amplifying the IF signal."
Q And why would you need to amplify the IF

signal in tuner 100?
A I haven't thought about direct conversion tuners for a long time, so I don't recall.
Q Why would the amplifier V1 need to be programmable?
Strike that.
Why would the gain of amplifier of V1 need to be programmable?
A I'm not sure. Perhaps the patent '362 discloses that. I don't know.
Q What is the function of band pass filter F1 in Figure 1 of the '362 patent?
A It looks like it is a low-pass filter. Because it's got -- unless I'm blurring the lines together on the block diagram. Can you tell if it has -- where the lines are inside of block f1?
Q I -- actually, I don't know enough electrical engineering to answer that question. But I can tell you is that column 1, line 62 to 64, that I referred you to, appears to say that filter f1 is a band pass filter.
A Okay. It -- I think the diagram is wrong perhaps. Unless my eyes are fooling me.
Q What is the -- how is the symbol for band pass filter different from the symbol for low-pass

filter?
A I would expect a line on both ends of -- both sinusoids for band pass, like the top and the bottom. And I think -- again, my eyes could be confusing me. It looks like it's a low-pass filter, which has no line on the bottom and -- two -- I can't tell. Two lines on the top, maybe. I -- so anyway, let's just go with what the spec says, if you want.
Q Sure. What is the function of the band pass filter F1 in Figure 1 of the '362 patent?
A I suppose it's to -- to suppress or attenuate the signals outside of the band of interest.
Q In the tuner of Figure 1, is the channel selection done by mixer M1 or by the band pass filter F1?
A I really haven't thought about direct conversion tuners in a long time. So I don't know.
Q Going to '362 patent, Column 1, lines 65 to 67. When the patent uses the term desired channels, is it referring to all the channels that contain programming in the bandwidth BW1 or is it referring to a subset of all channels that contain

programming that the user would then demodulate for watching?
ATTORNEY QUALEY: Objection to form.
THE WITNESS: Can you reread that, please?
BY ATTORNEY HENDIFAR:
Q Sure. Let me start over differently then. Would you please look at Figure 1 of the '362 patent.
A Is there a question?
Q Let me know when you have it so I can ask the question. I'm giving you --
A Figure 1?
Q Right. As a courtesy, I'm waiting for you to get --
A I'm sorry. Maybe I didn't hear you correctly. Okay. Go ahead.
Q Sure. Do you see that the frequency bandwidth 110 is shown with the bandwidth BW1? Do you see that?
A I see that, yes.
Q And you see that there are 8 channels centered around an FRFC center frequency?
A Okay.
Q Do you see that?

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A I do.
Q And then do you see that there are four of those A channels that are hatched and then four that are not hatched?
A I see different patterns.
Q Correct.
A In each of the -- each of the ones that are not white, like -- I see four different patterns.
Q Right. So when I said hatched, I didn't mean that they have the same pattern. So I apologize. But you see that; right?
A I do, yes.
Q And do you understand the '362 patent, when it refers to desired channels, it is referring to the four channels that are hatched with different hatchings?
A Well, I prefer to look at Figure 2, which I've spent time looking at.
Q Sure.
A Whereas -- in a similar fashion, I think.
Q Not a problem. So I'll repeat the question for Figure 2. That's fine.
A Okay.
Q In Figure 2 of the '362 patent, do you

see the frequency band shown in item 110 in that figure?
A Yes.
Q And do you see that frequency bandwidth BW1, it calls 180 megahertz is shown?
A That's right.
Q And do you understand that to show eight different channels? Yes?
Actually -- I apologize. Ten. That's not correct. Do you understand that in Figure 2, item 110, it is showing ten different frequency channels?
A It is showing ten -- ten different channel slots.
Q Okay. I apologize. Okay. And four of those ten channel slots have hatchings that are different but are hatchings; correct?
A Yeah. They have shadings. Different shadings on each of the four.
Q Thank you. And is it your understanding that when the patent refers to desired channels, it is referring to one of these four channels that are hatched out of those ten channels?
A Yes.
Q And is it your understanding that --

A Well, I think it's -- I'm sorry. It's -- this is contiguous and noncontiguous discussion, I believe. Whereas, you know, the blank slot, let's call it -- I think. Let me double-check whether Figure 2 is indicating that the white has content or not. I don't remember. Or if it is blank. Yeah. So it says in column 4, row -- starting around 27. I'm sorry. I'm not sure where 102 is. Let me find that. Oh, okay. Yeah. Okay. 102 is the input. Includes four desired RF channels having the respective carrier frequencies. And there's four of them listed corresponding to those four shaded sections. That are located in noncontiguous portions of the wideband spectrum BW1. So I think what he is saying here is that those white ones have no content in them. It is just an empty channel slot.
Q So is it your testimony that desired channels in the '362 patent refers to all channels that have content within the frequency band?
ATTORNEY QUALEY: Objection to form.
BY ATTORNEY HENDIFAR:
Q You've been reading for about five minutes. Let me ask you a bit differently so we can move along more quickly.

A I was trying to answer your question. But okay.
Q I mean, I understand you've been searching for about five minutes. And I'm not sure what document. But I'll go back to this question.
Can you look at Figure 4 of the '362 patent. Actually, I'm sorry. Figure -- Figure 2. I apologize. Figure 2 that you were looking at. If you could look at Figure 2.
A Okay.
Q Okay. And Figure 2, as output of module 200, is the signal that is the serial or parallel data interface to demodulator; correct?
A That's what it says, yes.
Q And what goes to the demodulator are the four channels -- F1, F2, F3, and F4 -- that are shown with different shadings in Figure 2; correct?
A Yes, that's right.
Q And in the system disclosed in Figure 2, as an expert, do you understand that all channels that are input in wideband receiver all channels that have content would be sent to the demodulators?

1 ATTORNEY QUALEY: Objection to form.
2 THE WITNESS: So I think you could
3 implement it several different ways. You could
4 output some or all of the -- the desired channels.
5 Simultaneously.
6 BY ATTORNEY HENDIFAR:
7 Q So --
8 A I mean, it says in -- in paragraph -- in
9 column 5, lines 43 through 47, it says in the
10 exemplary embodiment shown in number 2, the number
11 of desired channels is four. That is each of the
12 four complex mixers mixes in-phase and quadrature
13 signals 232 and 242 with an associated frequency
14 to generate a corresponding baseband, which is an
15 individually, decimated and provided to an
16 associated demodulator.
17 Q Okay. So it -- that -- which portion
18 were you reading? I'm sorry.
19 A It was '362 patent, Column 5, lines 43
20 through 47.
21 Q I'm looking at the wrong patent.
22 A It starts with, "In the exemplary
23 embodiment shown in Figure 2."
24 Q So in the portion of the '362 patent that
25 you read, it seems to say that all the desired

1 channels are sent to an associated demodulator.
2 Am I misunderstanding that portion?
3 A The example of four channels that is
4 Figure 2 is outputting four channels.
5 Q And it also says that the number of
6 desired channels is four; right?
7 A That's what I meant when I said the
8 number of channels. I meant the number of desired
9 channels is four.
10 Q Okay. So in the embodiment of Figure 2,
11 the number of desired channels is four, and four
12 channels are sent to demodulators; correct?
13 A That's right. In that embodiment.
14 Q Is it your -- based on your expertise, in
15 a system such as that of Figure 2 of the '362
16 patent, is it generally the case that all channels
17 with content would be sent to demodulators?
18 A You could do that.
19 Q Right. That was not my question.
20 A Zhang can definitely do that.
21 Q Right. But that was not my question. My
22 question was not what you could do. My question
23 was based on -- based on your expertise, is it the
24 case that in a system such as Figure 2 of the '362
25 patent, all channels with content would typically

1 be sent to the demodulator?
2 ATTORNEY QUALEY: Objection to form.
3 THE WITNESS: I don't know. It could be
4 implemented either way.
5 BY ATTORNEY HENDIFAR:
6 Q Is it your opinion that in the context of
7 the '362 patent, desired channels refers to all
8 channels with content within the bandwidth BW1?
9 ATTORNEY QUALEY: Objection to form.
10 THE WITNESS: So as I state in paragraph
11 100 of my declaration, it is talking about this
12 specific example. Some of the channels -- I'm
13 sorry. It is talking about Zhang. Some channels
14 are desired and some are not desired.
15 BY ATTORNEY HENDIFAR:
16 Q I didn't ask about Zhang. I'll repeat
17 the question. Is it your opinion that in the
18 context of the '362 patent, all desired channels
19 refers to all channels with content within the
20 bandwidth BW1?
21 ATTORNEY QUALEY: Objection to form.
22 THE WITNESS: So I don't know if the '362
23 defines desired. Perhaps it does. And if it
24 does, you can point me to that.
25

1 BY ATTORNEY HENDIFAR:
2 Q So you don't know the answer?
3 A I said I'm not sure that the '362 defines
4 desired.
5 Q That was not my question, Mr. Lett. My
6 question is, in the context of the '362 patent,
7 would a POSITA understand that desired channels
8 would refer to all channels with content within
9 the bandwidth BW1?
10 ATTORNEY QUALEY: Objection to form.
11 THE WITNESS: Again, Zhang -- the '362,
12 unless I'm mistaken, doesn't describe what he
13 means by desired television channels and
14 non-desired television channels or undesired
15 television channels. So I don't know the answer
16 to your question.
17 BY ATTORNEY HENDIFAR:
18 Q So in your opinion, a POSITA reading the
19 '362 patent wouldn't know whether in the
20 embodiment of Figure 2 desired channels refers to
21 all channels that have content or not?
22 ATTORNEY QUALEY: Objection to form.
23 THE WITNESS: So as I disclose in
24 Zhang --
25

1 BY ATTORNEY HENDIFAR:
2 Q Mr. Lett --
3 A -- with the '362 declaration --
4 Q Mr. Lett --
5 A -- Claim 1, I explain everything that
6 there is to know about desired channels.
7 Q Mr. Lett, for the tenth time. We're at
8 the end of the day. And you play this every time.
9 I ask you a question. You go back and read an
10 irrelevant answer from a declaration. Okay. We
11 are not here to waste either my time or your time.
12 I'm not asking you about Zhang. Okay. And if you
13 can't answer the question, you can say I don't
14 know the answer. You don't get to go read from
15 irrelevant portion from your declaration when it
16 is 6:00 p.m. your time. Okay. My question is not
17 about Zhang. I don't care about what Zhang does.
18 That's not my question. Okay. My question is
19 about what desired channels refers to in the
20 context of the '362 patent, Figure 2 embodiment we
21 reviewed. Okay? It is not --
22 A As I stated -- as I stated, the '362 does
23 not define desired, as far as I can tell.
24 Q And I didn't ask you if it defines it. I
25 asked you what a POSITA would understand. If you

1 don't know what a POSITA would understand or if
2 you think that a POSITA wouldn't know what it
3 means, you can state that. But I didn't ask you
4 if the '362 patent defines desired channel.
5 This is the question. Please pay
6 attention. The question is, is it your opinion
7 that in the context of the '362 patent, Figure 2
8 embodiment, a POSITA would understand that the
9 desired channels would refer to all channels with
10 content?
11 ATTORNEY QUALEY: Objection to form.
12 THE WITNESS: I think a POSITA would
13 understand desired channels to mean channels that
14 are of interest by a subscriber for watching or
15 recording and the desired channels could be
16 defined by the system rather than the subscriber.
17 BY ATTORNEY HENDIFAR:
18 Q Okay. So there may also be undesired
19 channels that have contents on them; correct?
20 A So that's right. So one would look at
21 the -- all of the channels coming in, right. And
22 if they wanted to watch or record or dictated by
23 the system or the -- or the program provider,
24 output those channels, you could -- you could
25 output the desired channels. And I think that's,

1 in general, what the invention is disclosing. And
2 Zhang also discloses those elements.
3 Q This was not my question. So I move to
4 strike the last element of your response. Please
5 focus your response on my question.
6 If it is a good time to break for the
7 day, I'm okay with that. But I do want Mr. Lett
8 to share on his camera any notes he's been looking
9 at. Because he said he has notes about paragraphs
10 that are listed. Did I misunderstand you at the
11 beginning of the day you have a listing of
12 specific paragraphs for specific issues?
13 A I do not. I explained what I had when we
14 started. And that's the same as what I have now.
15 Q So did I misunderstand you that I believe
16 you said you had a list of some paragraphs in your
17 declaration?
18 A I do not.
19 Q So all you have -- I'm sorry. Please go
20 ahead.
21 A Well, I can go through it again.
22 Q All you have is unmarked exhibits and
23 your declaration basically; right?
24 A That's right. Including the electronic
25 copies.

1 ATTORNEY HENDIFAR: Right.
2 And, Counsel, is it a good time to take a
3 break from your perspective for the day?
4 ATTORNEY QUALEY: That's fine, if you
5 want.
6 ATTORNEY HENDIFAR: Just we have to come
7 back tomorrow anyways since you mentioned you
8 don't want to go until another hour or so. We can
9 break for the day. Come back tomorrow. And I
10 looked at my calendar -- I have about maybe two
11 more hours, give or take. So if you can start
12 tomorrow at 9:30 Pacific, I would appreciate that.
13 And I don't think I will have more than two hours
14 left at this point.
15 ATTORNEY QUALEY: You can't start any
16 earlier than that? I mean, that is already
17 afternoon.
18 THE WITNESS: Half our day is gone if we
19 wait until then.
20 ATTORNEY HENDIFAR: I am on the West
21 Coast. And today we did start very early our
22 time.
23 ATTORNEY CUVIELLO: What time is your
24 conflict?
25 ATTORNEY HENDIFAR: I'm sorry?

ATTORNEY CUVIELLO: What time is your conflict?

ATTORNEY HENDIFAR: I'm expecting to finish by 8:30. But then I have to drive to the office. I may make it by 9:00. I may be ten minutes late. If you don't mind that, I will run as fast as I can.

ATTORNEY QUALEY: Okay. So why don't we aim for 9:00. And we will understand if you're a few minutes late.

ATTORNEY HENDIFAR: Okay. Wonderful. Okay.

And, Mr. Lett, I assume you didn't speak with anybody during the entirety of today since the deposition started regarding the substance of the deposition?

THE WITNESS: I did not.

ATTORNEY HENDIFAR: Very good. So let's break.

THE WITNESS: Do you think it is really going to take two more hours?

ATTORNEY HENDIFAR: Honestly, I did not expect it to go to a second day either. But given the dynamic of how it's been going, it might take two hours. Obviously if responses are more

responsive and direct, it will be shorter.

THE WITNESS: Well, you want to keep going?

ATTORNEY HENDIFAR: I defer to you. Your counsel said he wants to break. You guys tell me what you want to do.

THE WITNESS: I'm okay to keep going.

ATTORNEY QUALEY: Why don't we take a break and then come back.

ATTORNEY HENDIFAR: Let's take five minutes, break, and you discuss and let me know.

So we're not yet breaking, Ms. Madam Court Reporter.

Okay. Thanks. Let's come back in about five minutes.

(A recess was taken.)

ATTORNEY HENDIFAR: Mr. Lett, you know you're not allowed to speak with anyone about the substance of the deposition between now and tomorrow either; correct?

THE WITNESS: I understand.

ATTORNEY HENDIFAR: So we shoot for 9:00 a.m. Pacific, with the understanding that I may be ten or so minutes late.

ATTORNEY QUALEY: Understood.

(The proceedings concluded at 3:32 p.m.)

-oOo-

I have read the foregoing deposition transcript and by signing hereafter, subject to any changes I have made, approve same.

Dated: _____

_____

(Signature of Deponent)

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I further certify that I am not of counsel or attorney for any of the parties hereto or in any way interested in the event of this cause and that I am not related to any of the parties thereto.

Dated: December 11, 2024

Brooke Silvas

BROOKE SILVAS
CSR No. 10988

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Dated: December 11, 2024

Brooke Silvas
BROOKE SILVAS
CSR NO. 10988

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ERRATA SHEET

Deposition of David Lett

Date: 12/10/2024 (Day 1)

Case: Comcast Cable Communications, LLC -v- Entropic Communications, LLC, Case Nos. IPR2024-00432, -00435, -00438 (PTAB)

Magna Legal Job. No.: 1238320

PAGE/LINE(S)	CHANGE	REASON
8/25	sequence, 1002, -1003, -1004. There is probably some	typographical
24/22	parts that we put in designs. So in that regard,	typographical
27/8	would be much wider bandwidth than ~~at~~ that and -- and	transcription error
29/10	system in a way so that we could use ADC~~T~~ -- A-to-D	typographical
38/21	radio frequency tuning systems for satellite and/or	typographical
43/4	electrical circuit -- represented by the X symbol	transcription error
49/17	the patent. We use mixer circuits to ~~downcode~~ --	transcription error
52/24	delivered to~~by~~ the transport interface.	clarification
56/9	the pass band of the ~~pass~~ band-pass filter. And passes	clarification
81/18	have the en~~d~~ to be 150 there. So it just depends	transcription error
85/25	from any of those channels in the ~~R~~ -- in the	typographical
90/11-12	3140, in the case of the top one, 320, 3302~~1~~, 3140, parenthesis 1, ~~and, 330, parenthesis 1,~~ what I'm	clarification (misread 1 as 4)
90/18	elements 320, 3140, and 330, those elements, the	clarification
97/19	data bus 2 on the -- on the middle– for D2, and data	missing word
107/20	schematic diagram of a ~~of~~ digital tuner 300,	transcription error
116/3	channels and we're outputting to~~he~~ demodulators.	transcription error
127/1	is configured to output the claimed digital data stream	missing word
128/25	rather not render on the fly.	missing word

133/15	Figure of ~~in~~ the n by ~~?~~m selector 240, as	transcription error
133/23-25	That's -- so, again, the n by ~~?~~m selector 240, a block diagram implemented simply ~~identified block~~ ~~dram~~as Zhang explains is shown in Figure 5.	clarification
134/16	To~~In~~ the demodulator, yes.	clarification
150/23	~~No.~~	transcription error
151/19	That's right~~ye~~.	transcription error
158/25	my 362 declaration that uses complex mixers.	clarification
160/19	conversion architecture, it references Figure~~Exhibit~~ 7	transcription error
169/17-18	It compares a direct conversion receiver to a low-IF receiver.	clarification
181/11	Again, ~~Zhang~~ the '362,	clarification

1/13/25

Date

David B. Lett

David B. Lett

SUBSCRIBED AND SWORN TO BEFORE ME THIS 13 DAY OF January, 2025.

Notary Public

DIANA ROSALES QUINTANILLA
NOTARY PUBLIC
GWINNETT COUNTY, GEORGIA
MY COMMISSION EXPIRES DECEMBER 20, 2027

12/20/2027.

Commission Expiration Date