

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

COMCAST CABLE COMMUNICATIONS, LLC

Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,

Patent Owner.

CASE IPR2025-00180

Patent 11,785,275

Deposition of DAVID B. LETT, taken on behalf
of the Patent Owner, via Zoom videoconference,
commencing on the 23rd day of July, 2025, at the hour
of 9:00 a.m. PT, before Jillian Doctor, CSR No. 14603,
pursuant to Notice of Taking Deposition.

1 APPEARANCES
 2 FOR THE PETITIONER:
 3 BANNER & WITCOFF, LTD
 4 1100 13th Street, NW, Suite 1200
 Washington, DC 20005
 BY: Craig W. Kronenthal, Esquire
 5 Ckronenthal@bannerwitcoff.com
 6 FOR THE PATENT OWNER:
 7 LOWENSTEIN & WEATHERWAX LLP
 1016 Pico Boulevard
 8 Santa Monica, California 90405
 BY: Parham Hendifar, Esquire
 9 Hendifar@lowensteinweatherwax.com

18 JILLIAN DOCTOR, RPR, CRR
 COURT REPORTER

INDEX

WITNESS	EXAMINATION	PAGE
DAVID B. LETT	BY MR. HENDIFAR	4

EXHIBITS FOR IDENTIFICATION

Exhibit 2012	11
Lett Errata	

1 THE COURT REPORTER: Good morning. My name
 2 is Jill Doctor. License Number 14603. Would you
 3 please raise your right hand.

4 DAVID B. LETT,
 5 having been first duly sworn,
 6 was examined and testified as follows:

EXAMINATION

BY MR. HENDIFAR:

Q. Thank you. Good morning, Mr. Lett.

A. Good morning.

Q. You were deposed in connection with three
 12 additional IPRs, 2024-435, 432, and 438, earlier this
 13 year -- or late last year.

Do you recall that?

A. I don't remember if those are the numbers
 16 that -- you know, I don't have those numbers in front
 17 of me. But, yes, I did testify in related cases.

I need to turn up the volume just a little
 19 bit on your voice. Do I -- what do I need to press
 20 here to get that?

It's right here; right?

MR. KRONENTHAL: Yeah. Use that.

THE WITNESS: Or do I just press -- okay.

Oh. Okay. That's going to be really loud.

Let's not go that loud.

Okay. Let's try that.

Okay. Go ahead. I'm sorry.

BY MR. HENDIFAR:

Q. No worries.

So you were deposed in connection with three
 6 related cases between the same parties and IPRs
 7 2024-432, 435, and 438, I believe late last year.

Do you recall that?

A. Yeah, again, I haven't verified the numbers,
 10 but I'll take your word for it.

Q. Thank you.

Do you have any questions about the
 13 deposition process today?

A. No, I don't.

Q. You realize that you're testifying under
 16 oath; correct?

A. I do.

Q. And you are also aware that you are not
 19 allowed to speak with anyone regarding the substance
 20 of the deposition during the breaks today.

Do you understand that?

A. I do.

Q. And do you have any questions about the
 24 deposition process today?

A. I don't.

1 Q. Is there any reason why you may not be able
2 to provide your best testimony today?

3 A. No reason.

4 Q. Okay. What did you do to prepare for the
5 deposition today?

6 A. I spent some time studying my declaration
7 and other materials that were -- excuse me.

8 Declaration, I meant to say.

9 In my declaration and other materials. The
10 materials considered list, I would say. And I also
11 had some preparation sessions with the attorneys from
12 Banner Witcoff.

13 Q. And when did you meet with attorneys in
14 preparation for your deposition today?

15 A. I think it was -- I think it was last week
16 and this week.

17 Q. And how many days total did you meet --
18 strike that.

19 Approximately how many hours did you spend
20 meeting with attorneys in preparation for our
21 deposition today?

22 A. I would say around 15, ballpark. 15 hours.

23 Q. And how many of those hours were this week?

24 A. Probably about ten.

25 Q. And you testified that you reviewed your

1 Exhibits -- you know, starting with 1001 to wherever
2 they end. And also, I think the right description of
3 what else is on here is the record.

4 There is some documents labeled 1 through 18
5 that I really haven't looked at, I don't think. But
6 they're called the record, I think. In case we need
7 those, I can pull them up.

8 Q. Thank you very much.

9 Are any of the documents you have in front
10 of you marked?

11 A. No.

12 Q. And you submitted a declaration in this IPR.
13 And when I say this IPR, I mean the 2025-00180 that
14 follows Exhibit 1002; correct?

15 A. I'm sorry. That last part, I didn't quite
16 catch.

17 Q. Sure.

18 Going forward, when I refer to this IPR, I
19 will be referring to IPR 2025-00180.

20 Is that fair?

21 A. Yes.

22 Q. And a declaration was submitted by you in
23 this IPR that is filed as Exhibit 1002.

24 Do you have that?

25 A. Yes.

1 declaration and some other documents in connection
2 with your preparation for the deposition today.

3 Do you recall that?

4 A. Yes.

5 Q. And in connection with your preparation for
6 the deposition today, did you review any documents
7 that were not cited in your declaration, Exhibit 1002?

8 A. Not that I'm aware of.

9 Q. Did you prepare any notes that you're --
10 strike that.

11 Do you have any documents in front of you
12 right now?

13 A. I do.

14 Q. Okay. Would you please let me know what
15 documents you have available in front of you.

16 A. Yeah. I have printed copies of my
17 declaration. The -- Zhang's Exhibit 1013,
18 Exhibit 1001. And then I have printouts of several
19 pages of my -- that are also part of my declaration,
20 but just have them printed out separately. One is the
21 materials considered section, which is Pages 8 through
22 12. And then I have printed out the claims listing
23 appendix from my declaration.

24 And then I also have a folder on my computer
25 that is -- it includes all the materials considered,

1 Q. Okay. Did you sign that declaration?

2 A. I did.

3 Q. And what did you do in connection with your
4 analysis to prepare your declaration here?

5 A. So I studied the patent, the 275 patent.
6 And I studied the prior art references. And then I
7 studied some of the other materials considered in
8 order to create those opinions that are in the
9 declaration.

10 Q. And did you draft your declaration filed as
11 Exhibit 1002?

12 A. So it was a collaborative process between
13 myself and the attorneys. I have a hard time
14 remembering which ones -- I would say neither one of
15 us drafted it entirely. I would say we went back and
16 forth a bunch of times on different sections and
17 edits, and I honestly can't remember exactly, you
18 know, who did what.

19 Q. Fair enough.

20 Are you aware of any errors, either
21 typographical or substantive, in your declaration
22 filed as Exhibit 1002 in this IPR?

23 A. I did notice a couple of typos. If you
24 like, I can try to find those. But I think -- I think
25 it would be obvious that they're typos when you look

1 at them.

2 But one is -- I think I referred to Figure 2
3 or 6, and it should have been the other one.

4 And it's obvious by looking at it, it's the
5 one that I did not say. Right?

6 And the other one is I used a less than, you
7 know, mathematical symbol less than, instead of less
8 than equal than -- less than or equal to.

9 Those are the two typos I remember. You
10 know, upon my review over the last couple of weeks,
11 I'm like, oops, I must have missed that the first
12 time.

13 Q. Thank you.

14 Would you be kind enough to point me to the
15 typographical error that is the equal or less than so
16 I can just make sure I understand where that error is?

17 A. Okay. Let me see if I can find it. And I'm
18 going to do a search in my declaration for the symbol
19 less than or equal to -- or less than. And I think
20 that would maybe speed things up.

21 Q. Sure.

22 A. If that's okay.

23 Q. Of course. And please feel free to review
24 any document that you need when I ask questions, as
25 long as you just let me know what you're reviewing. I

1 added the document at the bottom.

2 THE WITNESS: Okay. Lett errata.

3 BY MR. HENDIFAR:

4 Q. Please let me know when you have it so I can
5 ask my questions.

6 A. Okay. I have it.

7 Q. Thank you.

8 I represent to you that this is the error
9 that was submitted to us by Comcast Cable
10 Communications as the errata in connection with the
11 two-day deposition that you had in cases IPR
12 2024-00432, 435, and 438.

13 And do you see on Page 2 and Page 4 of this
14 document, there are places with a signature where it
15 has your name at the bottom?

16 A. Yes, I see that.

17 Q. Are the signatures on Pages 2 and 4 of this
18 document your signatures?

19 A. Yes.

20 Q. Okay. And is it your testimony that this
21 document -- let me strike that.

22 So what is this document, based on your
23 understanding?

24 A. So the transcript of the deposition, it's
25 a -- it's corrections to the transcript of my

1 want your best testimony, so please feel free to
2 review anything. Just let me know what it is you are
3 reviewing.

4 A. Oh, okay. I found it really quickly, which
5 is surprising. I didn't expect it to be that quick.

6 Page 102 of my declaration.

7 Q. Okay.

8 A. At the very top, it says for m equals n, all
9 of the selected Channels C1 through Cn are output to
10 one or more demodulators. And for m is less than n,
11 the user may output some or all end channels of C1 to
12 Cn to the demodulators.

13 And the less than sign there in the second
14 line should be less than or equal to.

15 Q. Understood. Thank you very much.

16 I am going to put in the chat box a document
17 that we will mark as Exhibit 2012.

18 (DEPOSITION EXHIBIT NUMBER 2012
19 WAS MARKED FOR IDENTIFICATION.)

20 THE WITNESS: Okay.

21 BY MR. HENDIFAR:

22 Q. Please let me know when you have it.

23 A. What do I do? Click on...

24 MR. KRONENTHAL: Select chat down there, and
25 then you'll see the chat box open. And then he just

1 deposition referenced at the top.

2 Q. And did you compile the list of corrections
3 in Exhibit 2012?

4 A. Yes. This is -- the file is not labeled
5 Exhibit 2012, so I just assume that's correct as far
6 as the exhibit number.

7 Q. We are going to mark this document as
8 Exhibit 2012 here. So I will be referring to the
9 errata sheet as Exhibit 2012.

10 A. Okay. Fair enough.

11 Q. Did you carefully review the transcript of
12 your deposition in the prior IPRs to then compile the
13 errata sheet that is marked as Exhibit 2012?

14 A. I did, yes.

15 Q. Okay. And does Exhibit 2012 represent all
16 the errors that you were able to identify in your
17 earlier deposition?

18 A. I think so. Perhaps I missed some, but that
19 wasn't my intention.

20 Q. Are you aware of any errors in your earlier
21 deposition transcript that is not reflected in the
22 errata sheet that is Exhibit 2012?

23 A. I haven't looked at it since this time, so I
24 haven't really, you know, looked for any additional
25 errors. So the answer is no, I'm not aware of any.

1 Q. May I now please refer you to Exhibit 1001,
2 which is the 275 patent that is challenged in this
3 IPR.
4 A. Okay.
5 Q. Please let me know when you have that.
6 A. Okay. I have it.
7 Q. May I please refer you to Column 1, lines 52
8 to 55 of the 275 patent, and the sentence that reads,
9 quote, In general, television channels broadcasted
10 over the air or over cable networks are distributed
11 across a broad frequency spectrum. That is, the
12 channel frequencies may not be adjacent to each other.
13 Do you see that?
14 A. Yes.
15 Q. And then may I now please refer you to the
16 same Exhibit 1001, 275 patent, Column 2, lines 2
17 through 5. And the sentence that reads, quote, The RF
18 input signal may include the VHF and UHF television
19 channels in a terrestrial television broadcasting
20 system or the CATV -- if I'm pronouncing it
21 correctly -- channels in cable networks, end quote.
22 Do you see that sentence as well?
23 A. I do.
24 Q. What does broadcast channel mean?
25 A. Well, so in this particular case, it's

1 know.
2 Q. I'm sorry. I'm not sure if I understood the
3 answer to my question. Let me ask it again.
4 So is it fair to say that, at least in the
5 context of television broadcast systems, a broadcast
6 channel is basically a content channel?
7 A. I think a broadcast channel generally
8 contains content in most cases, except for corner
9 cases.
10 Q. And what does a corner case mean?
11 A. Well, you know, if you do something
12 99.9 percent of the time, it's not a corner case.
13 Right? Where as if you do something, let's say,
14 .1 percent of the time, I think, you know, a POSITA
15 would consider the .1 percent case to be a corner
16 case.
17 Q. And a corner case is the instance where you
18 testified for some reason a broadcaster may broadcast
19 a test pattern channel.
20 Did I understand that correctly?
21 A. I did, yes.
22 Q. Okay. If a test pattern can be considered
23 content, would it then be the case that all broadcast
24 channels are content channels in this context?
25 A. So, again, I think there are corner cases

1 talking about channels that are sent over the cable
2 network to, you know, subscribers. And whether those
3 subscribers receive them or not, it's still
4 transmitting.
5 Q. Who does the broadcasting for a broadcast
6 channel?
7 A. Well, I mean, it depends on the context.
8 Right? So from a cable head end, you could say that
9 the cable system operator is broadcasting. But, you
10 know, really, like in the case of a channel over the
11 air, you -- the cable company would receive that
12 signal broadcast from the -- over the air, for
13 example. Right? So there is different places, right,
14 but I think I answered your question.
15 Q. Thank you.
16 So am I understanding you correctly that in
17 this context of television channel broadcast networks,
18 a broadcast channel is basically a content channel?
19 A. I think a POSITA would consider a broadcast
20 channel to have content on it, you know. Otherwise --
21 I don't know. Maybe there is a reason to broadcast a
22 channel without content on it. You know, sometimes
23 you may be broadcasting a blank screen or a -- or a
24 test pattern or something. So I don't know if you
25 call a test pattern content. Maybe it is. I don't

1 that all content channels -- I'm sorry. Say that
2 again, please. Repeat your question.
3 Q. Of course.
4 So if test pattern channels can be
5 considered content, is it then the case that in the
6 context of television channel broadcast systems, a
7 broadcast channel is a content channel?
8 A. Again, I think there are corner cases other
9 than test patterns where a broadcast channel may not
10 have content.
11 Q. Are you aware -- would you -- are you aware
12 of any examples?
13 A. One example would be that there is an
14 equipment problem or a -- or a signal reception
15 problem or some other problem that is in the system.
16 So that, essentially, you're just broadcasting a blank
17 screen or -- yeah, a blank screen would be an example.
18 Q. So, essentially, a technical error where a
19 channel is mistaken and being broadcast without
20 content.
21 Is that the example you have?
22 A. That's one example, yes.
23 Q. Okay. Any other examples?
24 A. There are probably more, that's just the
25 only one I thought of off of the top of my head.

1 Q. Okay. So sitting here now, you are not
2 aware of any example of a broadcast channel not being
3 a content channel, other than a test pattern, which
4 may or may not be content, and an instance where a
5 technical error has resulted in a channel being
6 broadcast without content. And you have no other
7 example sitting here now.

8 Is that accurate?

9 MR. KRONENTHAL: Objection. Form.

10 THE WITNESS: I'm sorry. That was a really
11 long question. I think I lost you. Can you break it
12 down a little bit?

13 BY MR. HENDIFAR:

14 Q. Of course.

15 You testified that other than, in your
16 words, corner instances, a broadcast channel is
17 typically a content channel. And the two examples you
18 were able to provide for why a broadcast channel may
19 not be a content channel were, one, a pattern signal;
20 and, two, a technical error, where a channel is
21 mistakenly -- or through technical errors broadcast
22 without content.

23 And sitting here now, you are not aware of
24 any other examples where a broadcast channel may not
25 be a content channel.

1 Q. And specifically to Paragraph 6.

2 A. Paragraph -- what did you say?

3 Q. Zhang Exhibit 1013, Paragraph 6.

4 A. 6?

5 Q. 6, correct.

6 A. Okay. Thank you.

7 Q. Please let me know when you have it.

8 A. I have it.

9 Q. What does UHF band mean?

10 A. UHF band, he says 300 megahertz to 3
11 gigahertz.

12 Q. Okay. So it's just a nomenclature, that the
13 range of 300 to 600 megahertz -- 3 gigahertz, I'm
14 sorry, is called a UHF band?

15 A. That's what Zhang is disclosing, yes.

16 Q. Based on your expertise, is that an accurate
17 description?

18 A. I have no reason to dispute what he's
19 saying.

20 Q. And based on your expertise, is it accurate
21 that channels in the UHF band are spaced at
22 6 megahertz intervals?

23 A. In the United States, North America,
24 channels were generally spaced at 6 megahertz.

25 However, there is gaps in that band. Right?

1 Is that accurate?

2 A. And I think the right way to say it is, a
3 broadcast channel contains content or does not contain
4 content. And so there are probably other examples --
5 like, if someone wanted to intentionally broadcast
6 that blank channel, right, then they could do that.

7 You know, and so that would be not
8 necessarily due to a technical problem. They may want
9 to make some measurements or, for some other reason,
10 broadcast a blank channel.

11 You know, there is also cases where, you
12 know, content is -- it's contained within a broadcast
13 channel, is encrypted such a way, right, that one
14 would need to be authorized to receive that content to
15 see the content. And unless he was authorized to
16 receive that content, he would not see any content on
17 that broadcast channel.

18 And I may think of more examples as we go
19 along. But I think there are plenty of cases where,
20 you know -- and I called them corner cases, and that's
21 probably the right term -- that a broadcast channel
22 may not contain content.

23 Q. Okay. May I now please refer you to Zhang
24 Exhibit 1013.

25 A. Okay.

1 So, you know, I forget whether it's between
2 Channel 4 and 5 or between Channel 5 and 6, there is a
3 gap where, you know, there is other services that are
4 in those frequencies. Like an aeronautical band, for
5 example, as well as other areas.

6 So they were generally spaced 6 megahertz,
7 and then there were gaps in the bands where, you know,
8 other services may be in there.

9 Q. Thank you.

10 A. As one example.

11 Q. Okay. What does an RF channel mean?

12 A. Well, so both the 275 patent and the -- and
13 Zhang are given examples of an RF channel, which is,
14 essentially -- you know, they always refer to 6 -- I
15 think they always refer to 6 megahertz bandwidth
16 channels that have television signals on them.

17 Q. Is any frequency bandwidth necessarily a
18 channel?

19 A. It can be. I mean, you could just -- you
20 could say, okay, you know, here is a -- here is a
21 1 megahertz channel, here is 6 megahertz channel, you
22 know, depending on what you're doing. And both of
23 these patents, we're talking about television
24 channels.

25 And, again, in Europe, they were, you know,

1 8 megahertz and different, you know, bandwidths. But
2 in North America, generally, we're talking about
3 6 megahertz-wide bandwidth channels.

4 Q. Thank you.

5 Maybe I'll ask my question a bit
6 differently. I may not have been quite clear.

7 What makes a frequency band a channel as
8 opposed to just a blank frequency band?

9 A. I'm not sure. I mean, it starts at some
10 frequency and ends at some frequency. You know, like,
11 Channel 2 is 54 to 60 megahertz. Hopefully I got that
12 right. Anyway, so that's -- that's a channel. You
13 know, that has a slot, basically, that is defined as
14 that channel.

15 Q. Okay. Are there any requirements such as
16 standard definition controlling formation or other
17 criteria that would make a frequency band a channel as
18 opposed to just, for instance, a blank frequency band?

19 A. I think, in general, in the context of these
20 patents, a channel is a 6 megahertz slot. Right?

21 And I think they're talking about the
22 channel has a television signal in it, or not.

23 Q. I'm sorry. I didn't quite understand your
24 last sentence.

25 A. Let me think about how to say it more

1 clearly.

2 So I think a channel is a slot in frequency.
3 In the case of this context of these patents, we're
4 talking about 6 megahertz slots of frequencies.
5 Whatever is in them, they are channels.

6 Q. So any 6 megahertz slot and frequency, in
7 your view, would be considered a channel?

8 A. Yeah. Because it's defined with a start and
9 an end point.

10 Q. Where is that?

11 A. It's a slot where you can put things or not.

12 Q. And when you say it's defined with a start
13 and an end point, where would that definition be? Who
14 defines it?

15 A. Well, so, like, there are books that tell,
16 you know, like, the allocation of channels. Right?

17 So, like, for example, one of the exhibits
18 that I have is Exhibit 1033, modern cable television
19 technology. And if you look at the end, like -- let
20 me see if I can find it.

21 Oh. I found it pretty quickly, actually.
22 I'm surprised.

23 Appendix A of Exhibit 1033, channel
24 allocation.

25 Q. I apologize for interrupting. I'm sorry.

1 Which page of that exhibit are you looking
2 at? I'm sorry.

3 A. Yeah. I'm sorry. It's PDF Page 516. And
4 it's -- it says 986 Appendix A. I'm not sure if
5 that's right or not, but that's what's printed on the
6 page.

7 Q. So the bottom of each of those pages has a
8 number that seems to be added by Comcast.

9 Do you see at the bottom of each? 506 or
10 507, for instance.

11 A. Let me see. I have to turn it. Yeah, it's
12 upside down. So let me turn it the other way so I can
13 see it better.

14 Okay. I see it. Yeah. 516.

15 Q. Okay. So you're on Page 516 of Exhibit 1033
16 based on the bottom page numbers.

17 Is that correct?

18 A. Yes. That's correct.

19 Q. Okay.

20 A. Okay. So this is -- these are channel --
21 this is channel allocating, giving the frequencies,
22 with the bottom of the band and the start of the band
23 showing 6 megahertz chunks.

24 Q. So let's actually walk through that so I
25 fully understand what we are talking about.

1 So we are on Page 516 of Exhibit 1033. And
2 there is a table; right? Is that what you're
3 referring to?

4 A. That's right.

5 Q. Now, the first line of that table, where
6 there are numbers, Channel 1, there is a low megahertz
7 at 72 and a high megahertz at 76. And the spread
8 seems to be 4 megahertz.

9 So what does the 72 and 76 denote in this
10 table?

11 A. You know, based on my experience of a POSITA
12 in this area, we don't ever talk about Channel 1, so I
13 don't really remember what that's all about. We
14 always start talking about Channel 2 at 54 megahertz.

15 Q. Okay. What does 54 in Channel 2 denote?

16 A. That's the low edge of the 6 megahertz
17 bandwidth of Channel 2.

18 Q. Great. Okay.

19 And then do you see that Channel 6 ends at
20 88 megahertz; correct?

21 A. Yes.

22 Q. And then Channel 7 starts at 174 megahertz;
23 correct?

24 A. That's right.

25 Q. So there is a frequency band between

1 88 megahertz and 174 megahertz where no channel is
2 defined; correct?

3 A. That's correct for this table for television
4 signals. And in that -- in between there are other
5 services, I think. Like aeronautical, for example.

6 Q. But it's not a defined channel; correct?

7 A. Well, they're defined. It's just not in
8 this table. Like, they're defined elsewhere. Like,
9 for whatever services use those frequencies.

10 Q. Okay. But as far as the television
11 broadcast system is concerned, for example, in the
12 table on Page 516 of Exhibit 1033, the frequency band
13 between 88 to 174 is not a defined channel; correct?

14 A. Not in this table, no.

15 Q. And what is, exactly, the table on Page 516
16 of Exhibit 1033?

17 A. Well, at the time the book was written, it
18 was a standard developed by the joint -- EIA, now CEA
19 and CTA -- engineering, specifying the channel number
20 and corresponding frequencies for North America.

21 Q. Is that, basically Page 516 of Exhibit 1033,
22 the channel structure that Zhang is basically
23 referring to?

24 A. Yes. And also, the 275 patent are referring
25 to, you know, something very similar to this.

1 Off-air, as in cable instead of, for
2 instance, an antenna broadcast. Is that --

3 A. Yeah. Off-air would be a -- something
4 that's broadcast over the air, terrestrially, to
5 televisions. And then we also happen to put that
6 channel in the cable network, like same -- or
7 actually, it would probably be a different frequency,
8 but we'll talk about -- that's not matter -- it
9 doesn't matter.

10 So if you have ABC, that's a local channel,
11 right, and you want to receive it over the air with an
12 antenna, you can do that. Right?

13 And then -- but also when you subscribe to
14 cable, you would generally have Channel ABC received
15 on your -- as part of your cable system. And so a
16 POSITA might call that a broadcast channel even though
17 it's coming on cable or an off-air channel even though
18 it's coming on cable, you know, so it really just
19 depends.

20 A broadcast can be used in a number of
21 different ways. I mean, in one context, broadcast
22 means, you know, all the channels sent from the cable
23 system to the box, whether it's an off-air or not.
24 Right? So I think broadcast can be used in a lot of
25 different ways.

1 Q. Okay. And so channels that you see on the
2 left-hand side up to Channel 30, are those basically
3 the broadcast channels?

4 A. Well, I don't know. Broadcast sometimes --
5 I think for a POSITA, if you said it that way would
6 be -- you know, broadcast channels are maybe
7 synonymous with off-air channels. So when I'm talking
8 about a cable system, I kind of, like, talk about the
9 off-air channels.

10 Q. So I'm --

11 A. Talking about off-air channels. Like, in
12 other words, something that was, like, a CBS or an ABC
13 or PBS or something that would be also transmitted
14 over the air to televisions. A POSITA might call
15 those the broadcast channels as opposed to the off-air
16 channels --

17 Q. I'm sorry. Offer --

18 A. I'm sorry. I can't figure out which word
19 you were talking about.

20 Q. Offer? Offer channels?

21 A. Off-air.

22 Q. I'm sorry.

23 A. A-I-R. Yeah. I'm sorry. I ran it
24 together. Off-air.

25 Q. I see.

1 Q. Going back to the table on Page 516 of
2 Exhibit 1033, it gives me a numerical baseline to work
3 with. So referring, again, back to the -- at least in
4 the context of the television broadcast network,
5 undefined frequency between 88 to 174 between
6 Channels 6 and 7.

7 Do you recall that?

8 A. Yeah. I think I was actually referring to
9 that earlier, and I may have said the wrong channel
10 numbers earlier in this deposition because I just
11 didn't remember exactly which numbers they were.

12 Q. No worries.

13 Now, if you have a broadcast cable -- I'm
14 not sure what terminology you prefer to use, so let's
15 say a broadcast system, broadcast television system.

16 That broadcast television system wouldn't be
17 transmitting the frequency between 88 and 174 that is
18 the blank frequency between Channel 6 and 7, would it?

19 MR. KRONENTHAL: Objection. Form.

20 THE WITNESS: So cable systems, for example,
21 would broadcast other things in that slot. So, like,
22 a control channel where you could -- sometimes we call
23 it out-of-band channel even though it's in-band with
24 all these frequencies.

25 But it was in the industry called

1 out-of-band. Right? So one would transmit -- let's
2 call it command and control information to a set-top
3 box in -- somewhere in there. I don't remember
4 exactly, but somewhere in that slot you're talking
5 about. So it was broadcast from the cable network to
6 cable boxes.

7 BY MR. HENDIFAR:

8 Q. Let me ask differently.

9 Is the entire frequency band between 54 to
10 264 used by that cable or television broadcast system
11 one way or another?

12 A. Well, so it depends. Right? So cable
13 systems were flexible. They could do whatever they
14 wanted to because it's a closed system. Maybe that's
15 not the way to describe it. But they -- they were
16 allowed to transmit anything including in that band
17 88 -- excuse me -- yeah, 88 to 174 megahertz. They
18 were allowed to transmit in those bands.

19 Sometimes -- and probably, this reference
20 explains it, but Walscor [Phonetic] and Jim Farmer
21 would know very well that you generally didn't do
22 that, or -- any more than you -- you were very careful
23 on doing that because you want to make sure you don't
24 interfere with other services. Like aeronautical, for
25 example. And probably military. But I can't remember

1 supposed to let those frequencies get out into the
2 air, is what I'm saying.

3 Q. So the cable company has licensed those
4 frequency bands in the cable, and then other
5 industries have license to bands in the air?

6 A. I don't know about licensing. You know, I'm
7 just -- from a practical point of view, I know that
8 they were allowed to transmit on those frequencies. I
9 don't know whether there was a license or not. I tend
10 to think not, but I don't know the answer to that
11 question.

12 Q. Okay. And on Page 516 of Exhibit 1033, the
13 first column that is titled Channel, is that an RF
14 channel or a content channel?

15 A. It's a number indicating a frequency slot.

16 Q. Right. So -- but when the table uses the
17 term channel on Page 516 of Exhibit 1033, is the table
18 using the word channel as an RF channel or as a
19 content channel?

20 A. It's using it as a frequency slot that goes
21 from the beginning to the end of that slot. It's not
22 saying anything about content or RF, it's -- well,
23 it's talking about -- it's defined. You know,
24 Channel 11 means a slot from 198 to 204 megahertz.

25 Q. What does RF channel mean, in your opinion?

1 what else is in there. I would have to look it up --
2 a frequency allocation chart to see exactly.

3 But my point is that, I'm allowed to, as a
4 cable operator, transmit things in those bands; and I
5 do. Not me personally, but a cable multisystem
6 operator would transmit some things. But they were
7 very careful. And the reason they were very careful
8 was if there was any leakage or interference caused by
9 our signal to those other bands.

10 And so it's very difficult to go through the
11 cable network and find, like, where the leakage is
12 coming from. Like it may be a frayed coaxial cable or
13 something like that that's causing it to transmit
14 something that's interfering with, let's say, an
15 aeronautical band. It's very difficult to find those.
16 So we kind of avoided -- or let's say we were very
17 careful. The cable MSOs were very careful about what
18 to transmit in those frequencies.

19 Q. So that may be a part of my confusion.

20 So is it the case that that same frequency
21 band is both licensed to the cable company and to the
22 military and to some aeronautical company?

23 A. Well, so it's not transmitted over the air
24 by the cable company initially -- intentionally. So
25 it's a closed system. It's all in wires that are not

1 A. Is it referred to in the patents so I can
2 maybe get the context? Or can you refer me to where
3 that term's being used?

4 Q. I'm not sure I have that. But the field we
5 are talking about, television channel broadcast
6 systems. And in the context of television channel
7 broadcast systems, what does an RF channel mean, if
8 you have an opinion?

9 A. Well, so I think -- I think we're talking
10 about -- like, for example, you know -- I'm just
11 looking at the table here -- 26, Channel 26 is 234 to
12 240 megahertz. That frequency range is kind of
13 considered a radio frequency range, 234 to
14 240 megahertz. So I guess you could call that an RF
15 channel.

16 Q. Is it fair to say that the table on Page 516
17 of Exhibit 1033, in the first column, those are the RF
18 channel definitions?

19 A. Well, so this is kind of like what was
20 normal. Right? You could have other RF channels
21 that, as I described it, you could, as a cable
22 operator, broadcast on if you chose to.

23 Q. Right. But in the example on Page 516 --
24 let me -- maybe I can clarify my question.

25 So is it fair to say that in the example in

1 the table on Page 516 of Exhibit 1033, Channels 1
2 through 30 are RF channel definitions; correct?

3 A. They're showing the RF frequencies for each
4 channel number was 6 megahertz-wide bandwidth that are
5 normal, you know, part of this table without the other
6 things that I just described that were, perhaps,
7 exceptions to transmitting in the gaps.

8 Q. Now, what -- when you said 234 is an RF
9 frequency, what does that mean?

10 A. So -- just a second.

11 So in my declaration, in Paragraph 49, I
12 stated: "RF is the frequency range starting from
13 10 kilohertz to 1,000 megahertz" -- or excuse me --
14 "100,000 megahertz" -- correction -- "in the
15 electromagnetic spectrum."

16 And that's quoting a reference that it came
17 from.

18 Q. Okay. So it's a nomenclature, a certain
19 range of frequencies is called RF frequencies?

20 A. Well, it's understood from this background
21 reference that, generally, 10 kilohertz to
22 100,000 megahertz has frequencies in the RF range for
23 data transmission, wire to wireless between devices.

24 Q. Now, still discussing the table on Page 516
25 of Exhibit 1033, let's say Channel 20, 156 through

1 162 megahertz band.

2 Do you see that?

3 A. Yes.

4 Q. So generally speaking, when a channel is
5 being transmitted, it's upconverted from the baseband
6 to the transmission frequency; correct?

7 A. Yes. And modulated accordingly so that the
8 information can be transmitted.

9 Q. Now, for Channel 20, for instance, the 156
10 to 162, that's the transmission frequency to which the
11 baseband is upconverted; correct?

12 A. I think that's fair, yes.

13 Q. And then once the receiver receives, for
14 instance, Channel 20, it downconverts it to baseband;
15 correct? Generally speaking.

16 A. It may if it's selected to -- by the user
17 as -- if they're interested in it or whatever. It may
18 not be. It may be just --

19 You know, if you had like all these
20 channels, right -- I don't know how many there are.
21 But say there are -- just for example, say there is
22 150 of them. Right? You wouldn't downconvert all of
23 them to baseband. You'd only downconvert the ones
24 that the user was interested in watching or authorized
25 to watch and interested in watching.

1 Q. So do I understand you correctly that
2 desired channels are basically the channels the user
3 is interested in watching and is authorized to watch?

4 A. So the 275 patent, I don't think, defines
5 desired channels, but it gives an example of what I
6 understand he means by desired channels. So, like,
7 Figure 2 of the 275 patent shows a diagram with ten
8 channels. And four of them have hash markings, and
9 he's calling those desired channels.

10 And, similarly, Zhang talks about channels
11 that are used by a subscriber, selected or used by a
12 subscriber. And I generally understand that to mean
13 the same thing, that it's the ones that we might be
14 interested in downconverting the baseband or selecting
15 out of the full spectrum of channels that are selected
16 or used by a subscriber.

17 Q. Thank you very much.

18 And in order for a subscriber to use a
19 channel, that channel necessarily has to be
20 demodulated; correct?

21 A. Yeah. I think you would generally
22 demodulate. That's right.

23 Q. Is it fair to say that in the context of the
24 275 patent, a channel that is never demodulated would
25 not be considered a desired channel?

1 A. I think that's the way he uses it. Yes.

2 Q. So then let's go to Exhibit 1013, Zhang.

3 A. Okay. I'm there.

4 Q. Actually, we've been going for about an
5 hour. Would you like to take a 15-minute break? And
6 then it might be our last break.

7 A. Sure, if you want to. I'm okay with less
8 than 15 minutes.

9 Q. Sure. Well, how much of a break --

10 MR. HENDIFAR: And, Counsel, how much of a
11 break would you guys like?

12 MR. KRONENTHAL: Five. Five minutes good?

13 THE WITNESS: Let's do five.

14 MR. HENDIFAR: Let's make it seven so we
15 come back at top of the hour. Thank you. See you
16 guys at the top of the hour.

17 THE COURT REPORTER: Off the record.

18 (OFF THE RECORD AT 9:53 a.m. PT)

19 (ON THE RECORD AT 10:00 a.m. PT)

20 THE COURT REPORTER: Back on the record.

21 BY MR. HENDIFAR:

22 Q. Mr. Lett, welcome back. During the break,
23 did you speak with anyone regarding the contents of
24 your deposition?

25 A. No.

1 Q. May I please refer you now to Zhang
2 Exhibit 1013.
3 A. Okay.
4 Q. And let's start with Figure 2 of Zhang.
5 A. Okay.
6 Q. And you see on the left-hand side an RF
7 signal is input to Figure 2?
8 A. Yes.
9 Q. And in Block 220, high-speed analog to
10 digital converter, that an input signal is digitized;
11 correct?
12 A. Yes.
13 Q. And the digital channel demultiplexer 230
14 demultiplexes Channels C, as in Charlie, 1 through Cn,
15 as in November, from the input signal; correct?
16 A. That's right.
17 Q. And that --
18 A. I'm sorry. What word did you use?
19 Q. Demultiplexes.
20 A. Thank you. Yes is my answer.
21 Q. And n by m selector 240 selects Channels D1
22 through Dm from Channels C1 through Cn; correct?
23 A. Yes.
24 Q. And then it transmits Channels D1 through Dm
25 through demodulators; correct?

1 A. Yes.
2 Q. Now, what frequency would the numeric
3 controlled oscillator 310 be set to, to extract
4 Channel 20?
5 A. So we want the output signal to be 0 to
6 6 megahertz. Right? So we have to go in the middle
7 of the -- the 159 megahertz. We essentially need to
8 go and get that down to -- let's call it 3 megahertz.
9 Right? So it comes out 0 to 6 megahertz.
10 So you just pick a value of the NCO so when
11 it's multiplied together, it comes out 0 to
12 6 megahertz.
13 Q. So am I understanding correctly that in
14 Figure 3 of Zhang, Chain 1 is set to demultiplex
15 Channel 20, which has the -- which is defined as the
16 bandwidth between 156 and 162 megahertz, the output of
17 Chain 1, C1, is the frequency between 0 to
18 6 megahertz?
19 A. That's right.
20 Q. And then is the same process repeated for
21 different channels, C1 through Cn, in Zhang Figure 3?
22 A. Well, so each one of these -- let's call the
23 multiplier 320, the NCO 310, and the low-pass filter
24 330. Let's call it a --
25 Q. Chain?

1 A. Yes.
2 Q. Now, Figure 3 of Zhang is the circuitry for
3 the digital channel, demultiplexer 230; correct?
4 A. That's right. At a high level.
5 Q. I'm sorry?
6 A. At a high level.
7 Q. In Figure 3 of Zhang, you have numeric
8 controlled oscillator 310, which sets the frequency
9 for the multiplier 320; correct?
10 A. It provides a frequency that is multiplied
11 by the input frequency to produce the output at the
12 target frequency.
13 Q. Okay. And do you recall in Exhibit 10 -- do
14 you recall in Exhibit 1033, Page 516, we discussed
15 Channel 20 as an example?
16 A. Yes.
17 Q. So I'm going to use that example just so I
18 understand fully the description.
19 So we are going to use Channel 20, which is
20 defined as the bandwidth between 156 megahertz and
21 162 megahertz, to discuss Figure 3.
22 So let's assume that in Figure 3, the first
23 chain, 321, is set to demultiplex Channel 20, which is
24 the frequency between 156 to 162.
25 Do I understand that?

1 A. A C-chain. C -- capital C-chain. Let's
2 just call it that so I don't have to keep saying those
3 three elements over and over.
4 Now, you know, so for each channel that the
5 subscriber wishes to use, as described by desired
6 channels, the discussion that we had previously, each
7 C-chain chooses that particular desired channel so
8 that it comes out at baseband out of its C-chain.
9 So, for example, if I had -- well, that's
10 enough.
11 Q. So let's say that in Zhang Figure 3, the
12 input is Channels 1 to 30. So the input is
13 frequencies 54 to 264 megahertz; correct?
14 A. I believe that's Channel 2 through 30.
15 Q. I apologize. Let me stand correct.
16 Channel 1 is also 72, so it's in that range?
17 A. Yeah. I just said I didn't -- I don't
18 remember what that is. I'm sorry. I could probably
19 read above here and figure out what that is, but I
20 just don't remember.
21 Q. I don't want to waste your time, so let me
22 ask.
23 In Zhang Figure 3, let's assume that the
24 input is Channels 2 to 30, which would make the
25 bandwidth of the input 54 megahertz to 264 megahertz;

1 correct?
 2 A. Okay.
 3 Q. The output of Figure 3, if Figure 3 is going
 4 to extract Channels 2 to 30, would be 29 channels,
 5 each at 0 to 6 megahertz frequency; correct?
 6 A. Is that 29? I think it might be 28.
 7 Oh. Inclusive of the -- yeah, okay. So 29
 8 C-elements -- C-chains we called them. C-chains that
 9 each output 0 to 6 megahertz signal.
 10 Q. Okay. So now let's take that -- and then
 11 going to -- okay. Let's start example now to Zhang
 12 Figure 6 embodiment. And may I please refer you to
 13 Zhang Paragraph 41. Actually, let's actually look at
 14 Figure 6. That's easier. Let's look at Figure 6 of
 15 Zhang itself.
 16 A. Okay.
 17 Q. And do you see that in Zhang Figure 6, the
 18 input frequency band is 540 to 750 megahertz?
 19 A. I do.
 20 Q. And that is a bandwidth of 210 megahertz.
 21 Is that correct?
 22 A. That's right.
 23 Q. And the output of the channel demultiplexer
 24 630, which I believe corresponds to the demultiplexer
 25 230 of Figure 2, is Channels C1 to 35.

1 channels.
 2 Q. Are there any channels -- in Zhang Figure 6,
 3 are there any Channel -- strike that.
 4 In Zhang Figure 6, are there any channels in
 5 the input signal of 540 to 750 that are not
 6 demultiplexed by the demultiplexer Channels 1 through
 7 35?
 8 A. No. He doesn't show in Figure 6
 9 demultiplexing less channels than on the RF input.
 10 But he clearly discloses that in a number of places in
 11 the patent. In the -- Zhang's patent.
 12 Q. So I'm asking about Figure 6.
 13 So in Zhang Figure 6, demultiplexer that
 14 demultiplexes Channels C1 through C35 has
 15 demultiplexed all the channels -- all the RF channels
 16 in the input signal; correct?
 17 A. In this specific example, yes.
 18 Q. And in Zhang's Figure 6, the output of the
 19 demultiplexer 630 are Channels C1 through C35;
 20 correct?
 21 A. That's right.
 22 Q. And each of those channels occupy the same
 23 frequency of 0 to 6 megahertz; correct?
 24 A. That's right.
 25 Q. The inputs of the channel demultiplexer is

1 Is that correct?
 2 A. Yes. In this embodiment.
 3 Q. Now, in the embodiment of Figure 6, 35
 4 channels are demultiplexed from the input signal;
 5 correct?
 6 A. That's right. In this embodiment.
 7 Q. Now, do you recall that we discussed that in
 8 Zhang, each of the channels are, generally speaking,
 9 6 megahertz in bandwidth; correct?
 10 A. Those are the examples that he uses, but I
 11 don't know if it's restricted to 6 megahertz.
 12 Q. But in the example that it uses, they are
 13 6 megahertz in bandwidth, the channels; correct?
 14 A. That's right.
 15 Q. And in Zhang Figure 6, 35 Channel C times
 16 6 megahertz each, that's 210 megahertz in bandwidth;
 17 correct?
 18 A. I think so, yes.
 19 Q. And the inputs of Zhang Figure 6 was also
 20 210 megahertz in bandwidth; correct?
 21 A. That's right.
 22 Q. So in Zhang Figure 6 embodiment, Channels C1
 23 through C35 constitute all the RF input channels;
 24 correct?
 25 A. Well, I would say it's all the desired

1 the frequency band of 540 to 750.
 2 Is that correct?
 3 A. Well, actually, he's showing 280C. So if
 4 you want to say the input to the Figure 6 is 540 to
 5 750 megahertz, that's correct.
 6 Q. And then a digital selector 640 in Zhang
 7 Figure 6 selects 20 channels, D1 through D20, from the
 8 35 demultiplexed channels, C1 through C35; correct?
 9 A. So Zhang digital selector is put in for the
 10 purpose of fast channel change. So what he discloses
 11 is that any one of those D-elements can select any of
 12 those C-elements at any particular time.
 13 And what he describes is that I can quickly
 14 switch between these 35 channels on my 20 outputs by
 15 just a very fast switch. Right? So it's not that,
 16 you know, D -- C1 corresponds to D1 and C2 corresponds
 17 to D2, and this kind of thing. It's that D1 can be
 18 any of C1 through C35 at any particular time, and so
 19 on for each of the D-elements.
 20 Q. No dispute.
 21 So less Channels -- in this example of
 22 Figure 6 -- strike that.
 23 In the example of Figure 6, 20 channels, D,
 24 are sent to demodulators, correct, at any given time?
 25 A. I'm sorry. I missed part of that. Could

1 you repeat it?

2 Q. In Zhang's Figure 6 embodiment, at any given

3 time, 20 channels, D, are sent to demodulators;

4 correct?

5 A. That's right. In this particular, specific

6 embodiment.

7 Q. And 20 is less than 35; correct?

8 A. Yes.

9 Q. In Zhang's Figure 6, at any given time, less

10 Channels, D, are sent to demodulators than -- strike

11 that.

12 Where is the logic in Zhang's Figure 6 that

13 determines which of the 20 channels, D, are selected

14 from Channels C1 through 35 to be sent to demodulators

15 at any given time?

16 A. Can you be more specific about where is the

17 logic?

18 Q. Sure.

19 So -- okay. How does Zhang determine which

20 Channels D1 through D20 are selected from Channels C1

21 through C35 to be sent to demodulators at any given

22 time?

23 A. So the subscriber selects which ones he

24 wants to watch or record.

25 Q. Okay. And then when the subscriber makes

1 Q. And Channels D1 through D20 are also, each

2 one, 6 megahertz, from 0 to 6; correct?

3 A. Well, it just takes the Cs, right, and

4 outputs whichever C it is. So because C is -- the C

5 channels are 6 megahertz, the D channels are

6 6 megahertz in this example and embodiment.

7 Q. So the digital selector 640 itself does not

8 perform any extraction of channels; correct?

9 A. I would say the extraction is done -- well,

10 the selection of which channel we want to -- that is

11 desired. Which one is desired is done by 630. And

12 which ones go to a demodulator at a particular time of

13 the desired channel, C1 through C35, are done by the

14 digital selector.

15 Q. Is it possible that in Zhang Figure 6, some

16 of Channels C1 through 35 would never be selected by a

17 user to go to demodulators?

18 A. It's possible, but what he's -- what he's

19 describing here is a fast channel change between C1 to

20 C35 for any one of these demodulators.

21 So one would -- you know, what he discloses

22 is that I've got them all, C1 through C35, on the

23 input to the digital selector. Maybe it's my favorite

24 channel list, you know? Like, I like ESPN and HBO and

25 Channel 5 and 2 and whatever. Right? They could be

1 that selection, where in Zhang Figure 6 is that

2 selection logic implemented in the circuitry?

3 A. When we're talking about from the desired

4 channels C1 through C35, selecting between those

5 desired channels to watch at any particular time, that

6 selection is made by the -- the element 640 digital

7 selector in Figure 6.

8 Q. So there is a logic in the digital selector

9 640 in Figure 6 of Zhang that implements the user

10 selection of the user-selected channels, one of D1

11 through D20, to be sent to demodulators?

12 A. Yeah. The user selection of the desired

13 channels, C1 through C35.

14 Q. I'm sorry. Maybe we are talking past each

15 other.

16 Maybe I'll ask again.

17 You testified that Zhang -- the way Zhang

18 determines which channels, D1 through D20, are sent to

19 demodulators are based on the user selection; correct?

20 A. That's right.

21 Q. And you testified that the logic where Zhang

22 implements which of Channels D1 through D20 are

23 selected based on the user selection is in the

24 selector 640; correct?

25 A. That's right.

1 all there ready to quickly switch between my favorite

2 channels.

3 Q. If a user does not watch a specific channel,

4 that channel would not be demodulated; correct?

5 A. Well, Zhang discloses that the selection of

6 which ones to select can be made by the subscriber. I

7 think he also says by the service provider.

8 Like, for example, if I had -- if I was not

9 subscribed to HBO, right, I would probably -- whether

10 you call it selecting or not, I would never really

11 select HBO in that specific example. And with one of

12 the C-chains. We wouldn't waste one of the C-chains

13 on something that we're not authorized to watch.

14 Q. Maybe my question was not clear.

15 If a channel that is not watched or recorded

16 or otherwise used by -- strike that.

17 If a channel [sic] does not watch or record

18 a channel, that channel would not be demodulated.

19 Is that fair?

20 MR. KRONENTHAL: Objection. Form.

21 THE WITNESS: Can you repeat the question?

22 BY MR. HENDIFAR:

23 Q. Of course.

24 If a channel is not watched or recorded by a

25 user, that channel would not be demodulated.

1 Is that fair?

2 A. I don't think either Zhang or the 275
3 disclosed the answer to that question.

4 Q. Okay. Now, selector 640 in Zhang Figure 6
5 selects Channels D1 through D20 from Channels C1
6 through C35 to then be sent to demodulators; correct?

7 A. That's what the diagram is showing, yes.

8 Q. Where specifically in Figure 6, digital
9 selector 640, is the logic that allows Zhang to select
10 Channels D1 through D20 from Channels C1 through C35?

11 A. It's not shown in this -- it's just shown as
12 a box in this diagram.

13 Q. Does anywhere in Zhang explain that?

14 A. Yes. There is -- there is more detailed
15 explanation in other places.

16 Q. Okay. So Figure 5 of Zhang is the circuitry
17 for the selector 640 slash 240; correct?

18 A. Well, it's a -- it's a functional block
19 diagram, example of 240 or -- what's the other number?
20 640, is it? Yes. 240 or 640.

21 Q. Okay. So where in Zhang Figure 5 would the
22 logic -- strike that.

23 Where would a POSITA understand, in Zhang
24 Figure 5, the logic for selecting Channel D1 through
25 Dm be located?

1 stuff that's going on and described throughout Zhang
2 in 640 or 240.

3 Q. Now, would the logic for selecting D1
4 through Dm in Figure 5 of Zhang be located in the bus
5 selector portion or in the time division demultiplex
6 portion of Figure 5?

7 A. The logic for selecting C1 through Cn are in
8 the C-chains. The C-chains can select the number of
9 channels that are desired from the input spectrum.
10 And Zhang clearly discloses that.

11 Q. Maybe my question was not clear.

12 So at some point, Channels D1 through Dm
13 would have to be selected from Channels C1 through Cn.

14 We discussed that; correct?

15 A. I mean, I think -- I'm not sure you have to
16 use a digital selector. I think it's kind of an
17 enhanced capability that allows you to do this fast
18 channel change. And it could just -- it could just
19 output directly C1 through Cn, you know. But -- but
20 the reason that they want -- that Zhang describes
21 having this enhanced capability is to support this
22 fast channel change feature.

23 Q. Let's step back for a moment. Can we go
24 back to Figure 6 of Zhang?

25 A. Okay.

1 A. I don't think he shows where the logic is.

2 He describes the functionality and shows that it can
3 be used to provide this switching capability between
4 the desired C1 through Cn channels.

5 Q. Would a POSITA understand where the logic in
6 Figure 5 for selecting Channels D1 through Dm have to
7 be located?

8 A. I think they would have a pretty good idea
9 of different places they could do it.

10 Q. Okay. Would you please elaborate?

11 A. So, I mean, the circuit -- you'd have to
12 essentially draw a schematic diagram of this, of
13 Figure 5. And you would see in there some way to
14 control the switches so that we, essentially, can
15 route the signals in different ways within this box.
16 And so you'd have to -- you'd have to look at the
17 digital circuitry. And then probably the
18 microprocessor would be involved in selecting the
19 digital circuitry that we want for particular -- at a
20 particular point in time.

21 And, also, you know, as I've talked about in
22 the declaration, this Figure 5 also contains
23 additional capabilities, like -- like time division
24 multiplexing and serial parallel -- or parallel
25 interfaces and serial interfaces. So there is lots of

1 Q. And do you recall we discussed 20 of the 35
2 channels in the input signal are transmitted to the
3 demodulators; correct?

4 A. That's what this diagram shows, yes.

5 Q. And do you recall that you testified that
6 the way Zhang determines the 20 channels at any given
7 time that are sent to demodulators, that selection is
8 done in the digital selector 640.

9 Do you recall that?

10 A. That's right.

11 Q. And my question is that the logic to select
12 the 20 channels at any given time that are sent to
13 demodulators from the 35 input channel, is that in the
14 bus selector portion of the selector, or is that in
15 the time division demultiplexer portion of the
16 selector?

17 A. So I don't think Zhang discloses where that
18 is exactly. He describes the functionality and then
19 provides a high-level block diagram with some of that
20 functionality as shown in Figure 5. It's not like a
21 schematic or anything.

22 Q. May I please now refer you to the 275
23 patent, Exhibit 1 [sic], Figure 2.

24 So Exhibit 1 --

25 A. Okay.

1 Q. I apologize.
 2 A. Figure 2?
 3 Q. Correct.
 4 A. Okay.
 5 Q. And in Figure 2 of Exhibit 1001, there is an
 6 RF input signal.
 7 Do you see that?
 8 A. Yes.
 9 Q. And then there is a digital front end 230.
 10 Do you see that as well?
 11 A. Yes.
 12 I think you're talking a little softer. I'm
 13 having a little trouble hearing you.
 14 Q. Okay. So in Figure 2 of Exhibit 1001, there
 15 is an output of the digital front end with a label
 16 "Serial or parallel data interface to demodulator."
 17 Do you see that?
 18 A. Yes.
 19 Q. And do you necessarily have to have a
 20 digital selector at the output of Figure 2 to be able
 21 to output to serial or parallel data interfaces from
 22 the digital front end?
 23 A. So I'm not sure I understand the question.
 24 Could you rephrase it?
 25 Q. Of course.

1 Q. What is the purpose of Block 610, frequency
 2 block downconverter?
 3 A. So in my declaration on Page 59, I show the
 4 mapping of the functionality of the RF front end of
 5 the 275 patent to Zhang's 210.
 6 So it's the same as what the -- 275 has.
 7 Q. And what is that purpose?
 8 A. I'm sorry?
 9 Q. Sure.
 10 What is the purpose -- maybe I didn't
 11 understand that.
 12 So my question was not how it relates to the
 13 patent, my question was, in Figure 6 of Zhang, what is
 14 the purpose of the frequency block downconverter 610?
 15 A. So the -- that shifts the spectrum down and
 16 also has a quadrature complex mixer that allows us to
 17 digitize it with the next stage, which is the analog
 18 to digital converter.
 19 Q. And why would -- why is there a need for
 20 that downconverter block?
 21 A. You want to get the spectrum of the signal
 22 down to a point where it's easier to process by the
 23 circuitry.
 24 Q. Okay. And in Zhang Figure 6, the spectrum
 25 of frequencies that is input to the channel

1 In Figure 2 of Exhibit 1001, is there
 2 necessarily a digital selector that is not shown at
 3 the output of the digital front end to select desired
 4 channels and send them to demodulators?
 5 A. I don't think Zhang describes the enhanced
 6 capability of --
 7 [Simultaneous speaking.]
 8 THE WITNESS: I'm sorry. I'm sorry.
 9 I don't think -- I don't think the patent --
 10 the 275 patent describes the enhanced capability of
 11 Zhang which allows you to support this fast channel
 12 change capability.
 13 BY MR. HENDIFAR:
 14 Q. Okay. So you do not -- in Figure 2 of
 15 Exhibit 1001, there doesn't necessarily need to be a
 16 digital selector similar to Zhang's at the output of
 17 the digital front end 230; correct?
 18 A. He doesn't describe this fast channel change
 19 capability, which is the reason for the digital
 20 selector, as disclosed by Zhang. And the 275 does not
 21 have this fast channel change feature, so, therefore,
 22 it does not have the equivalent of the digital
 23 selector from Zhang.
 24 Q. Going to Zhang Figure 6 again, if you would.
 25 A. Okay.

1 demultiplexer 630 is different from the spectrum of
 2 frequencies output as Channels C1 through C35;
 3 correct?
 4 A. Well, so the C-chains, which is essentially
 5 block C30, select 6-megahertz channels, the number of
 6 desired 6-megahertz channels from the full spectrum
 7 that's been downshifted.
 8 Q. Right.
 9 So Channels D1 through D20 in Figure 6 that
 10 are sent to demodulators are not selected from the
 11 full spectrum of the downconverted frequency that is
 12 input to the channel demultiplexer 630; correct?
 13 A. I'm sorry. Could you repeat that again,
 14 please?
 15 Q. Of course.
 16 In Zhang's Figure 6, Channels D1 through D20
 17 that are sent to demodulators are not selected from
 18 the full spectrum of downconverted frequency that is
 19 input into the channel demultiplexer 630; correct?
 20 A. They are. They're selected from the full
 21 spectrum of frequencies. Because C1 through Cn can
 22 select any of those frequencies that are in the full
 23 spectrum. In this case, 540 to 750 megahertz. Right?
 24 It's going to select -- it can select any of those
 25 channels from 540 to 750 megahertz on each of the

1 C-chains. And because of that, the digital selector
2 is just a switch. It puts the same thing -- so if I
3 wanted -- if I wanted D1 to select C1, it's the same
4 as C1 which came from the full spectrum of frequencies
5 540 to 750 megahertz.

6 Q. Okay. But the selector 640 cannot select as
7 frequency in the input spectrum that is not extracted
8 as Channels C1 through C35; correct?

9 A. The combination of 630 and 640, part of or
10 full, causes the output D1 through Dn.

11 Did that answer your question?

12 Q. Not exactly. So I don't dispute with you
13 that the combination of 630 plus all or part of 640 in
14 Zhang Figure 6 causes -- to use your term -- the
15 output D1 through D30. Of course.

16 My question is, in Zhang Figure 6, focusing
17 just on D1 through D20, those channels could not be
18 selected -- could not be a frequency in the input
19 signal that is not extracted by the demultiplexer 630;
20 correct?

21 MR. KRONENTHAL: Objection. Form.

22 THE WITNESS: Could you break that down a
23 little bit?

24 BY MR. HENDIFAR:

25 Q. Sure.

1 equal to n, which is the number of C-elements.

2 So they can be equal, or they can be less.

3 Q. Thank you.

4 A. He discloses both.

5 Q. Thank you.

6 So I don't dispute with you that Channels C
7 are selected from the input frequency.

8 My question is whether Channels D are
9 selected from the input frequency, or are they
10 selected from Channels C?

11 A. So this functionality is -- so if you said
12 let's make D -- let's make C equals to D. Right?
13 We're selecting -- it's the exact same thing. C1 is
14 the exact same thing as D1. C2 is the exact same as
15 D2. And so on and so forth.

16 All of those are selected from the input
17 frequencies. In other words, Zhang's digital selector
18 can be configured as -- to just pass through all the
19 Cs.

20 Q. Got it.

21 So you're talking about the situation where
22 n equals m, where all Channels C are selected as
23 Channels D to be sent to demodulators; correct?

24 A. That was one example. They could also
25 output all of the Cs with this fast channel change

1 Do you recall that you testified -- if you
2 look at Zhang Figure 6 channel demultiplexer 630, the
3 frequency spectrum input into the demultiplexer is
4 different from the output frequency, which is Channel
5 C1 through C35; correct?

6 A. That's right.

7 Q. So if a specific frequency band is not
8 extracted by channel demultiplexer 630 in Zhang
9 Figure 6, the channel selector cannot select that
10 unextracted frequency to be sent to demodulators;
11 correct?

12 A. Well, the selection is done with C1 through
13 C35. So -- or C1 through Cn in the more general case.
14 The C-chains do the selecting from the input spectrum,
15 and, therefore, any of the C-chains that are passed on
16 to a D is from the full spectrum input -- selected
17 from the full spectrum input.

18 Q. Right.

19 So C is -- I'm not disputing with you that
20 Channels C are selected from the full spectrum input.
21 Let me ask this question.

22 Do you agree that Channels D, as in David, 1
23 through 20 is a subset of Channels C1 through C35?

24 A. Well, Zhang discloses that m, which is the
25 D -- the number of D-elements, can be less than or

1 capability, which is the reason for the digital
2 selector as disclosed by Zhang.

3 Q. Now, let's consider the situation that is
4 described in Figure 6, where Channels D are the subset
5 of Channels C.

6 A. Okay.

7 Q. So 35 Channels D, 35 Channels C. Okay?

8 A. Okay.

9 Q. In Zhang's Figure 6, are Channels D1 through
10 20 selected from Channels C1 through C35, or are they
11 selected from the input frequency spectrum through the
12 demultiplexer 630?

13 MR. KRONENTHAL: Objection. Form.

14 THE WITNESS: So perhaps it's easier if we
15 just put a box around 630 and 640, and say, like,
16 that's one box. Perhaps -- I think you're getting
17 confused by this enhanced feature capability of Zhang.

18 D1 through D20 are selected from the input
19 spectrum.

20 BY MR. HENDIFAR:

21 Q. I have no further questions.

22 A. Okay.

23 MR. KRONENTHAL: Okay. So just so I
24 understand, so you're complete with your examination?
25 And Counsel for petitioner has no further questions as

1 well.

2 MR. HENDIFAR: Thank you very much.

3 THE WITNESS: Thank you.

4 THE COURT REPORTER: Do you need a copy,
5 Counsel?

6 MR. KRONENTHAL: We can wait for the copy
7 standard delivery.

8 (Deposition concluded at 10:44 a.m. PT.)
9

DECLARATION

1 I hereby declare I am the deponent in the within
2 matter; that I have read the foregoing deposition and
3 know the contents thereof; and I declare that the same
4 is true of my knowledge except as to the matters which
5 are therein stated upon my information or belief, and
6 as to those matters, I believe them to be true.

7 I declare under the penalties of perjury that the
8 foregoing is true and correct.

9 Executed this _____ day of _____,
10 20_____, _____.

CERTIFICATE

1 I, the undersigned Certified Shorthand Reporter,
2 holding a valid and current license issued by the
3 State of California, do hereby certify:

4 I do hereby certify that the above and foregoing
5 transcript of proceedings in the matter aforementioned
6 was taken down by me in machine shorthand, and the
7 questions and answers thereto were reduced to writing
8 under my personal supervision, and that the foregoing
9 represents a true and correct transcript of the
10 proceedings given by said witness upon said hearing.

11 I further certify that I am neither of counsel nor
12 of kin to the parties to the action, nor am I in
13 anyway interested in the result of said cause.
14

15
16
17
18 /s:// Jillian Doctor
19 JILLIAN DOCTOR, RPR,
20 CERTIFIED REALTIME REPORTER
21
22
23
24
25

A			
ABC	agree	33:8,14 34:8 36:5	7:23 23:23 24:4
27:12 28:10,14	59:22	37:4 38:6,10 39:15	Approximately
able	ahead	52:16 54:5,15	6:19
6:1 13:16 18:18	5:2	analog	are
54:20	air	38:9 56:17	4:15 5:18,18 7:19 8:9
about	14:10 15:11,12 27:14	analysis	9:8,20 10:9 11:2,9
5:12,23 6:24 15:1	28:4,11 31:23 32:2	9:4	12:14,17 13:7,20
21:23 22:2,21,25	32:5	another	14:10 15:1 16:24,25
23:4 24:25 25:12,13	all	30:11	17:8,11,11,24 18:1
25:14 27:8,8,11,19	7:25 11:8,11 13:15	answer	18:23 19:4,19 20:21
28:8 30:5 31:17	16:23 17:1 25:13	13:25 16:3 32:10	21:3,13 22:15 23:5
32:6,22,23 33:5,10	28:22 29:24 31:25	38:20 50:3 58:11	23:15 24:1,20,25
36:10 37:4 44:12	35:19,22 43:23,25	answered	25:1,6 26:4,24 27:2
46:16 47:3 51:21	44:15,15 48:22 49:1	15:14	27:6 31:25 33:5,17
60:21	58:13 60:16,18,22	answers	34:2,4 35:20,21
above	60:25	64:8	36:2,11,15 39:19
41:19 64:5	allocating	antenna	43:4,8,10,12 44:2,3
accordingly	24:21	28:2,12	44:4,5,19 45:24
35:7	allocation	any	46:3,10,13,20 47:14
accurate	23:16,24 31:2	5:12,23 6:1 7:6,9,11	47:18,19,22 48:1,5
18:8 19:1 20:16,20	allowed	8:9 9:20 10:24	48:5,13 52:7,9 53:2
across	5:19 30:16,18 31:3	13:20,24,25 17:12	53:7,12 57:10,10,17
14:11	32:8	17:23 18:2,24 19:16	57:17,20,22 59:15
action	allows	21:17 22:15 23:6	59:20 60:7,8,9,16
64:13	50:9 52:17 55:11	30:22 31:8 44:2,3,4	60:22 61:4,9,10,18
actually	56:16	45:11,11,12,18,18	63:5
23:21 24:24 28:7	along	45:24 46:2,9,15,21	area
29:8 37:4 42:13,13	19:19	47:5 48:8,20 53:6	25:12
45:3	also	53:12 57:22,24	areas
added	5:18 6:10 7:19,24 8:2	59:15	21:5
12:1 24:8	19:11 26:24 27:13	anyone	around
additional	28:5,13 41:16 43:19	5:19 37:23	6:22 61:15
4:12 13:24 51:23	48:1 49:7 51:21,22	anything	art
adjacent	56:16 60:24	11:2 30:16 32:22	9:6
14:12	always	53:21	as
aeronautical	21:14,15 25:14	Anyway	4:6 8:23 9:10,22
21:4 26:5 30:24	am	22:12	10:24,25 11:17
31:15,22	11:16 15:16 40:13	anywhere	12:10 13:5,6,7,9,13
aforementioned	63:3 64:12,13	50:13	14:22 16:13 19:18
64:6	America	anywise	21:5,5,10 22:7,13
again	20:23 22:2 26:20	64:14	22:15,17 26:10,10
5:9 16:3,25 17:2,8	an	apologize	27:15 28:1,15 31:3
21:25 29:3 47:16	17:13,17 18:4 20:16	23:25 41:15 54:1	32:18,18,20 33:21
55:24 57:13	21:4,11,13 23:9,13	APPEAL	33:21 35:17 38:14
	27:12 28:2,11,17,23	1:2	38:15 39:15,20
	31:14 32:13,18 33:7	appendix	40:15 41:5 50:11

51:21 53:20 54:10 55:20 56:6 57:2 58:4,6,8 59:22 60:14,14,18,22 61:2 61:25 63:4,5 ask 10:24 12:5 16:3 22:5 30:8 41:22 47:16 59:21 asking 44:12 assume 13:5 39:22 41:23 at 1:16 8:5 10:1,4 11:8 12:1,15 13:1,23 16:4 20:21,24 22:9 22:10 23:19 24:2,9 25:7,7,14,19,22 26:17 29:3 33:11 37:15,16,18,19 39:4 39:6,11 41:8 42:5 42:13,14 45:12,18 45:24 46:2,9,15,21 47:5 48:12 51:16,19 52:12 53:6,12 54:20 55:2,16 59:2 62:8 attorneys 6:11,13,20 9:13 authorized 19:14,15 35:24 36:3 49:13 available 7:15 avoided 31:16 aware 5:18 7:8 9:20 13:20 13:25 17:11,11 18:2 18:23 A-I-R 27:23 a.m 1:17 37:18,19 62:8	B 1:14 3:4 4:4 back 9:15 29:1,3 37:15,20 37:22 52:23,24 background 34:20 ballpark 6:22 band 20:9,10,14,21,25 21:4 22:7,8,17,18 24:22,22 25:25 26:12 30:9,16 31:15 31:21 35:1 42:18 45:1 59:7 bands 21:7 30:18 31:4,9 32:4,5 bandwidth 21:15,17 22:3 25:17 34:4 39:20 40:16 41:25 42:20 43:9,13 43:16,20 bandwidths 22:1 Banner 2:3 6:12 baseband 35:5,11,14,23 36:14 41:8 based 12:22 20:16,20 24:16 25:11 47:19,23 baseline 29:2 basically 15:18 16:6 22:13 26:21,22 27:2 36:2 be 4:24 6:1 8:19 9:25 10:14 11:5,14 13:8 14:12 15:23 16:15 16:22,23 17:4,13,17 18:4,19,25 19:7,14 21:8,19 23:7,13	24:8 25:8 27:6,13 28:3,7,20,24 29:16 31:12,19 35:8,18,18 36:13,19,25 37:6 40:3,5 42:4,6 45:17 46:14,16,21 47:11 48:16,25 49:4,6,18 49:25 50:6,25 51:3 51:7,18 52:4,13 54:20 55:15 58:17 58:18 59:10,25 60:2 60:2,18,23 63:5 because 23:8 29:10 30:14,23 48:4 57:21 58:1 been 4:5 10:3 22:6 37:4 57:7 before 1:2,17 beginning 32:21 behalf 1:14 being 17:19 18:2,5 33:3 35:5 belief 63:5 believe 5:7 41:14 42:24 63:5 best 6:2 11:1 better 24:13 between 5:6 9:12 21:1,2 25:25 26:4,13 29:5,5,17 29:18 30:9 34:23 39:20,24 40:16,17 45:14 47:4 48:19 49:1 51:3 bit 4:19 18:12 22:5 58:23 blank	15:23 17:16,17 19:6 19:10 22:8,18 29:18 block 38:9 50:18 53:19 56:1,2,14,20 57:5 BOARD 1:2 book 26:17 books 23:15 both 21:12,22 31:21 60:4 bottom 12:1,15 24:7,9,16,22 Boulevard 2:7 box 11:16,25 28:23 30:3 50:12 51:15 61:15 61:16 boxes 30:6 break 18:11 37:5,6,9,11,22 58:22 breaks 5:20 broad 14:11 broadcast 14:24 15:5,12,17,18 15:19,21 16:5,5,7 16:18,23 17:6,7,9 17:19 18:2,6,16,18 18:21,24 19:3,5,10 19:12,17,21 26:11 27:3,4,6,15 28:2,4 28:16,20,21,24 29:4 29:13,15,15,16,21 30:5,10 33:5,7,22 broadcasted 14:9 broadcaster 16:18 broadcasting
---	--	---	--

B

14:19 15:5,9,23 17:16 bunch 9:16 bus 52:4 53:14 but 4:17 5:10 7:20 8:5 9:24 10:2 13:18 15:9,14 19:19 22:1 24:5 26:6,10 28:8 28:13 29:25 30:4,15 30:20,25 31:3,5,6 32:10,16 33:4,23 35:21 36:5 41:19 43:10,12 44:10 48:18 52:19,19 58:6 by 2:4,8 3:4 4:8 5:3 8:22 10:4 11:21 12:3,9 18:13 24:8 26:18 30:7,10 31:8,24 35:16 36:6,11,11,16 37:21 38:21 39:11 41:5 44:6 45:14 47:6 48:11,13,16 49:6,7,16,22,24 55:13,20 56:22 58:19,24 59:8 61:2 61:17,20 64:3,7,11	2:8 64:4 call 15:25 27:14 28:16 29:22 30:2 33:14 40:8,22,24 41:2 49:10 called 8:6 19:20 20:14 29:25 34:19 42:8 calling 36:9 came 34:16 58:4 can 8:7 9:24 10:16,17 12:4 16:22 17:4 18:11 21:19 23:11 23:20 24:12 28:12 28:20,24 33:1,2,24 35:8 45:11,13,17 46:16 49:6,21 51:2 51:14 52:8,23 57:21 57:24 59:25 60:2,2 60:18 62:6 cannot 58:6 59:9 can't 9:17 27:18 30:25 capabilities 51:23 capability 51:3 52:17,21 55:6 55:10,12,19 61:1,17 capital 41:1 careful 30:22 31:7,7,17,17 carefully 13:11 case 1:10 8:6 14:25 15:10 16:10,12,15,16,17 16:23 17:5 23:3 31:20 57:23 59:13 cases 4:17 5:6 12:11 16:8,9	16:25 17:8 19:11,19 19:20 catch 8:16 CATV 14:20 cause 64:14 caused 31:8 causes 58:10,14 causing 31:13 CBS 27:12 CEA 26:18 certain 34:18 Certified 64:2,19 certify 64:4,5,12 chain 39:23 40:14,17,25 challenged 14:2 change 45:10 48:19 52:18,22 55:12,18,21 60:25 Charlie 38:14 chart 31:2 chat 11:16,24,25 chooses 41:7 chose 33:22 chunks 24:23 circuit 51:11 circuitry	39:2 47:2 50:16 51:17,19 56:23 cited 7:7 Ckronenthal@ban... 2:5 claims 7:22 clarify 33:24 clear 22:6 49:14 52:11 clearly 23:1 44:10 52:10 Click 11:23 closed 30:14 31:25 Cn 11:9,12 38:14,22 40:21 51:4 52:7,13 52:19 57:21 59:13 coaxial 31:12 collaborative 9:12 column 14:7,16 32:13 33:17 combination 58:9,13 Comcast 1:4 12:9 24:8 come 37:15 comes 40:9,11 41:8 coming 28:17,18 31:12 command 30:2 commencing 1:16 Communications 1:4,7 12:10 company 15:11 31:21,22,24
--	--	--	---

32:3	15:7,17 16:5,24 17:6	could	40:21 42:25 43:22
compile	22:19 23:3 28:21	15:8 19:6 21:19,20	44:14,19 45:8,16,18
13:2,12	29:4 33:2,6 36:23	29:22 30:13 33:14	46:14,20 47:4,13
complete	control	33:20,21 41:18	48:13,16,19,22 50:5
61:24	29:22 30:2 51:14	45:25 48:25 51:9	50:10 51:4 52:7,13
complex	controlled	52:18,18 54:24	52:19 57:2,21 58:3
56:16	39:8 40:3	57:13 58:17,18,22	58:4,8 59:5,12,13
computer	controlling	60:24	59:23 60:13 61:10
7:24	22:16	counsel	C2
concerned	converter	37:10 61:25 62:5	45:16 60:14
26:11	38:10 56:18	64:12	C30
concluded	copies	couple	57:5
62:8	7:16	9:23 10:10	C35
configured	copy	course	43:23 44:14,19 45:8
60:18	62:4,6	10:23 17:3 18:14	45:18 46:21 47:4,13
confused	corner	49:23 54:25 57:15	48:13,20,22 50:6,10
61:17	16:8,10,12,15,17,25	58:15	57:2 58:8 59:5,13
confusion	17:8 18:16 19:20	COURT	59:23 61:10
31:19	correct	2:18 4:1 37:17,20	
connection	5:16 8:14 13:5 20:5	62:4	D
4:11 5:5 7:1,5 9:3	24:17,18 25:20,23	Craig	D
12:10	26:2,3,6,13 34:2	2:4	3:1 45:16,23 46:3,10
consider	35:6,11,15 36:20	create	46:13 48:5 59:16,22
15:19 16:15 61:3	38:11,15,22,25 39:3	9:8	59:25 60:8,12,12,23
considered	39:9 41:13,15 42:1	criteria	61:4,7
6:10 7:21,25 9:7	42:5,21 43:1,5,9,13	22:17	data
16:22 17:5 23:7	43:17,20,24 44:16	CRR	34:23 54:16,21
33:13 36:25	44:20,23 45:2,5,8	2:18	David
constitute	45:24 46:4,7 47:19	Cs	1:14 3:4 4:4 59:22
43:23	47:24 48:2,8 49:4	48:3 60:19,25	day
contain	50:6,17 52:14 53:3	CSR	1:16 63:9
19:3,22	54:3 55:17 57:3,12	1:17	days
contained	57:19 58:8,20 59:5	CTA	6:17
19:12	59:11 60:23 63:7	26:19	DC
contains	64:10	current	2:4
16:8 19:3 51:22	correction	64:3	declaration
content	34:14	C-chain	6:6,8,9 7:1,7,17,19
15:18,20,22,25 16:6	corrections	41:1,1,7,8	7:23 8:12,22 9:1,4,9
16:8,23,24 17:1,5,7	12:25 13:2	C-chains	9:10,21 10:18 11:6
17:10,20 18:3,4,6	correctly	42:8,8 49:12,12 52:8	34:11 51:22 56:3
18:17,19,22,25 19:3	14:21 15:16 16:20	52:8 57:4 58:1	63:1
19:4,12,14,15,16,16	36:1 40:13	59:14,15	declare
19:22 32:14,19,22	corresponding	C-elements	63:3,4,7
contents	26:20	42:8 45:12 60:1	defined
37:23 63:4	corresponds	C1	22:13 23:8,12 26:2,6
context	42:24 45:16,16	11:9,11 38:22 40:17	26:7,8,13 32:23

39:20 40:15	1:14,18 5:13,20,24	9:16 15:13 22:1 28:7	51:23 52:5 53:15
defines	6:5,14,21 7:2,6	28:21,25 40:21 51:9	Dm
23:14 36:4	11:18 12:11,24 13:1	51:15 57:1 59:4	38:22,24 50:25 51:6
definition	13:12,17,21 29:10	differently	52:4,12
22:16 23:13	37:24 62:8 63:3	22:6 30:8	Dn
definitions	describe	difficult	58:10
33:18 34:2	30:15 55:18	31:10,15	do
delivery	described	digital	4:14,19,19,23 5:8,12
62:7	33:21 34:6 41:5 52:1	38:10,13 39:3 45:6,9	5:17,21,22,23 6:4
demodulate	61:4	47:6,8 48:7,14,23	7:3,11,13 8:24 9:3
36:22	describes	50:8 51:17,19 52:16	10:18 11:23,23
demodulated	45:13 51:2 52:20	53:8 54:9,15,20,22	12:13 14:13,22,23
36:20,24 49:4,18,25	53:18 55:5,10	55:2,3,16,17,19,22	16:11,13 19:6 24:9
demodulator	describing	56:18 58:1 60:17	25:19 28:12 29:7
48:12 54:16	48:19	61:1	30:13,21 31:5 35:2
demodulators	description	digitize	36:1 37:13 39:13,13
11:10,12 38:25 45:24	8:2 20:17 39:18	56:17	39:25 42:17,19 43:7
46:3,10,14,21 47:11	desired	digitized	51:9 52:17 53:1,5,9
47:19 48:17,20 50:6	36:2,5,6,9,25 41:5,7	38:10	54:7,10,17,19 55:14
53:3,7,13 55:4	43:25 47:3,5,12	directly	59:1,14,22 62:4
57:10,17 59:10	48:11,11,13 51:4	52:19	64:4,5
60:23	52:9 55:3 57:6	disclosed	Doctor
demultiplex	detailed	50:3 55:20 61:2	1:17 2:18 4:2 64:18
39:23 40:14 52:5	50:14	discloses	64:18
demultiplexed	determine	44:10 45:10 48:21	document
43:4 44:6,15 45:8	46:19	49:5 52:10 53:17	10:24 11:16 12:1,14
demultiplexer	determines	59:24 60:4	12:18,21,22 13:7
38:13 39:3 42:23,24	46:13 47:18 53:6	disclosing	documents
44:6,13,19,25 53:15	developed	20:15	7:1,6,11,15 8:4,9
57:1,12,19 58:19	26:18	discuss	does
59:2,3,8 61:12	devices	39:21	13:15 14:24 15:5
demultiplexes	34:23	discussed	16:10 19:3 20:9
38:14,19 44:14	diagram	39:14 43:7 52:14	21:11 25:9,15 32:25
demultiplexing	36:7 50:7,12,19	53:1	33:7 34:9 46:19
44:9	51:12 53:4,19	discussing	48:7 49:3,17 50:13
denote	did	34:24	55:20,22
25:9,15	4:17 6:4,13,17,19 7:6	discussion	doesn't
depending	7:9 9:1,2,3,10,18,23	41:6	28:9 44:8 55:15,18
21:22	10:5 13:2,11,14	dispute	doing
depends	16:20,21 20:2 37:23	20:18 45:20 58:12	21:22 30:23
15:7 28:19 30:12	38:18 58:11	60:6	done
deponent	didn't	disputing	48:9,11,13 53:8
63:3	8:15 11:5 22:23	59:19	59:12
deposed	29:11 30:21 41:17	distributed	don't
4:11 5:5	56:10	14:10	4:15,16 5:14,25 8:5
deposition	different	division	15:21,24,25 25:12

25:13 27:4 30:3,23 32:6,9,10 35:20 36:4 41:2,17,20,21 43:11 50:2 51:1 53:17 55:5,9,9 58:12 60:6	45:7 46:20 47:11,18 47:22 48:1 50:5,10 57:9,16 58:17 61:18	23:9,13,19 32:21 54:9,15,22 55:3,17 56:4	even 28:16,17 29:23
down 11:24 18:12 24:12 40:8 56:15,22 58:22 64:7	D30 58:15	ends 22:10 25:19	ever 25:12
downconvert 35:22,23	<hr/> E <hr/>	engineering 26:19	exact 60:13,14,14
downconverted 57:11,18	E 2:1,1 3:1 64:1,1	enhanced 52:17,21 55:5,10 61:17	exactly 9:17 26:15 29:11 30:4 31:2 53:18 58:12
downconverter 56:2,14,20	each 14:12 24:7,9 34:3 40:22 41:4,6 42:5,9 43:8,16 44:22 45:19 47:14 48:1 57:25	enough 9:19 10:14 13:10 41:10	examination 3:3 4:7 61:24
downconverting 36:14	earlier 4:12 13:17,20 29:9 29:10	entire 30:9	examined 4:6
downconverts 35:14	easier 42:14 56:22 61:14	entirely 9:15	example 15:13 17:13,17,21,22 18:2,7 21:5,10 23:17 26:5,11 29:20 30:25 33:10,23,25 35:21 36:5 39:15,17 41:9 42:11 43:12 44:17 45:21,23 48:6 49:8,11 50:19 60:24
downshifted 57:7	edge 25:16	ENTROPIC 1:7	examples 17:12,23 18:17,24 19:4,18 21:13 43:10
draft 9:10	edits 9:17	equal 10:8,8,15,19 11:14 60:1,2	except 16:8 63:4
drafted 9:15	EIA 26:18	equals 11:8 60:12,22	exceptions 34:7
draw 51:12	either 9:20 50:2	equipment 17:14	excuse 6:7 30:17 34:13
due 19:8	elaborate 51:10	equivalent 55:22	Executed 63:9
duly 4:5	electromagnetic 34:15	errata 3:10 12:2,10 13:9,13 13:22	exhibit 3:9 7:7,17,18 8:14,23 9:11,22 11:17,18 13:3,5,6,8,9,13,15 13:22 14:1,16 19:24 20:3 23:18,23 24:1 24:15 25:1 26:12,16 26:21 29:2 32:12,17 33:17 34:1,25 37:2 38:2 39:13,14 53:23 53:24 54:5,14 55:1 55:15
during 5:20 37:22	element 47:6	error 10:15,16 12:8 17:18 18:5,20	
D-elements 45:11,19 59:25	elements 41:3	errors 9:20 13:16,20,25 18:21	
D1 38:21,24 45:7,16,17 46:20 47:10,18,22 48:1 50:5,10,24 51:6 52:3,12 57:9 57:16 58:3,10,15,17 60:14 61:9,18	else 8:3 31:1	ESPN 48:24	
D2 45:17 60:15	elsewhere 26:8	Esquire 2:4,8	
D20	embodiment 42:12 43:2,3,6,22 46:2,6 48:6	essentially 17:16,18 21:14 40:7 51:12,14 57:4	
	encrypted 19:13	Europe 21:25	
	end 8:2 11:11 14:21 15:8		

exhibits 3:8 8:1 23:17	38:7 39:2,7,21,22 40:14,21 41:11,19 41:23 42:3,3,12,14 42:14,17,25 43:3,15 43:19,22 44:2,4,8 44:12,13,18 45:4,7 45:22,23 46:2,9,12 47:1,7,9 48:15 50:4 50:8,16,21,24 51:6 51:13,22 52:4,6,24 53:20,23 54:2,5,14 54:20 55:1,14,24 56:13,24 57:9,16 58:14,16 59:2,9 61:4,9	29:20 30:24 33:10 34:3,22 35:9,9,13 35:21 36:18 37:4 39:2,9 40:20 41:4,9 45:9,19 48:20 49:8 50:17,24 51:6,19 52:3,7,23 55:19 56:19 61:1,25 62:6	44:23 45:1 56:1,14 57:11,18 58:7,18 59:3,4,7,10 60:7,9 61:11
expect 11:5			from 6:11 7:23 15:8,12 28:22 30:5 31:12 32:7,21,24 34:12,17 34:20 35:5 38:15,22 43:4 45:7 46:14,20 47:3 48:2 50:5,10 52:9,13 53:13 54:21 55:23 57:1,6,10,17 57:20,25 58:4 59:4 59:14,16,17,20 60:7 60:9,10,16 61:10,11 61:18
experience 25:11		foregoing 63:3,7 64:5,9	front 4:16 7:11,15 8:9 54:9 54:15,22 55:3,17 56:4
expertise 20:16,20		forget 21:1	full 36:15 57:6,11,18,20 57:22 58:4,10 59:16 59:17,20
explain 50:13		Form 18:9 29:19 49:20 58:21 61:13	fully 24:25 39:18
explains 30:20		formation 22:16	functional 50:18
explanation 50:15	file 13:4	forth 9:16 60:15	functionality 51:2 53:18,20 56:4 60:11
extract 40:3 42:4	filed 8:23 9:10,22	forward 8:18	further 61:21,25 64:12
extracted 58:7,19 59:8	filter 40:23	found 11:4 23:21	
extraction 48:8,9	find 9:24 10:17 23:20 31:11,15	four 36:8	
	first 4:5 10:11 25:5 32:13 33:17 39:22	frayed 31:12	
F	five 37:12,12,13	free 10:23 11:1	
F 64:1	flexible 30:13	frequencies 14:12 21:4 23:4 24:21 26:9,20 29:24 31:18 32:1,8 34:3 34:19,19,22 41:13 56:25 57:2,21,22 58:4 60:17	
fair 8:20 9:19 13:10 16:4 33:16,25 35:12 36:23 49:19 50:1	focusing 58:16	frequency 14:11 21:17 22:7,8 22:10,10,17,18 23:2 23:6 25:25 26:12 28:7 29:5,17,18 30:9 31:2,20 32:4 32:15,20 33:12,13 34:9,12 35:6,10 39:8,10,11,12,24 40:2,17 42:5,18	
far 13:5 26:10	folder 7:24		
Farmer 30:20	follows 4:6 8:14		
fast 45:10,15 48:19 52:17 52:22 55:11,18,21 60:25	for 2:2,6 3:8 5:10 6:4,14 6:20 7:2,5 10:18 11:8,10,19 13:24 15:5,12 16:8,18 18:18 19:9 21:4 22:18 23:17,25 24:10 26:3,3,5,9,11 26:20 27:5 28:1		
favorite 48:23 49:1			
feature 52:22 55:21 61:17			
feel 10:23 11:1			
field 33:4			
figure 10:2 27:18 36:7 38:4			

43:8 get 4:20 32:1 33:2 40:8 56:21 getting 61:16 gigahertz 20:11,13 given 21:13 45:24 46:2,9 46:15,21 53:6,12 64:11 gives 29:2 36:5 giving 24:21 go 4:25 5:2 19:18 31:10 37:2 40:6,8 48:12 48:17 52:23 goes 32:20 going 4:24 8:18 10:18 11:16 13:7 29:1 37:4 39:17,19 42:3 42:11 52:1 55:24 57:24 good 4:1,9,10 37:12 51:8 got 22:11 48:22 60:20 Great 25:18 guess 33:14 guys 37:11,16	28:5 hard 9:13 has 12:15 18:5 22:13,22 24:7 32:3 34:22 36:19 40:15 44:14 56:6,16 61:25 hash 36:8 have 4:16 5:12,23 7:11,15 7:16,18,20,22,24 8:9,24 9:13 10:3,11 11:22 12:4,6 14:5,6 15:20 17:10,21 18:6 20:7,8,18 21:16 22:6 23:18 24:11 28:10,14 29:9,13 31:1 32:5 33:4,8,20 36:8 39:7 40:6 41:2 51:6,8,11,16,16 52:13,15 54:19,19 55:21,22 61:21 63:3 haven't 5:9 8:5 13:23,24 having 4:5 52:21 54:13 HBO 48:24 49:9,11 he 11:25 19:15,16 20:10 36:6 37:1 43:10 44:8,10 45:10,13 46:23 48:21 49:7 51:1,2 53:18 55:18 60:4 head 15:8 17:25 hearing 54:13 64:11 Hendifar 2:8 3:4 4:8 5:3 11:21 12:3 18:13 30:7 37:10,14,21 49:22 55:13 58:24 61:20	62:2 Hendifar@lowenst... 2:9 here 4:20,21 8:3 9:4 13:8 18:1,7,23 21:20,20 21:21 33:11 41:19 48:19 hereby 63:3 64:4,5 he's 20:18 36:9 45:3 48:18,18 high 25:7 39:4,6 high-level 53:19 high-speed 38:9 holding 64:3 honestly 9:17 Hopefully 22:11 hour 1:16 37:5,15,16 hours 6:19,22,23 how 6:17,19,23 22:25 35:20 37:9,10 46:19 56:12 However 20:25	16:13,22 17:4 19:5 23:19,20 24:4 27:5 28:10 29:13 31:8 33:7,22 35:16,17,19 37:7 41:9 42:3 43:11 45:3 49:3,8,8 49:15,17,24 55:24 58:2,3 59:1,7 60:11 61:14 implemented 47:2 implements 47:9,22 include 14:18 includes 7:25 including 30:16 Inclusive 42:7 indicating 32:15 industries 32:5 industry 29:25 information 30:2 35:8 63:5 initially 31:24 input 14:18 38:7,10,15 39:11 41:12,12,24 41:25 42:18 43:4,23 44:5,9,16 45:4 48:23 52:9 53:2,13 54:6 56:25 57:12,19 58:7,18 59:3,14,16 59:17,20 60:7,9,16 61:11,18 inputs 43:19 44:25 instance 16:17 18:4 22:18 24:10 28:2 35:9,14
---	--	--	--

instances 18:16	14:25 15:3 16:12 19:12 20:12 21:1	10:25 11:2,25 13:5 17:16,24 20:12	label 54:15
instead 10:7 28:1	23:8,11,12 24:3,4 24:11 26:6,7 28:17	21:19 22:8,18 26:7 28:18 29:10 32:7	labeled 8:4 13:4
intention 13:19	28:18,23 29:23 30:14 31:10,15,23	33:10 34:6,10 35:18 35:21 39:17 40:10	last 4:13 5:7 6:15 8:15 10:10 22:24 37:6
intentionally 19:5 31:24	31:25,25 32:15,20 32:21,22,23,23	41:2,17,20 45:15 48:3 50:11 52:18,18	late 4:13 5:7
interested 35:17,24,25 36:3,14 64:14	34:18,20 35:5,16 36:13 40:11 41:16	58:2,17 60:18 61:15 61:23	leakage 31:8,11
interface 54:16	43:11,25 45:15,17 48:18,23 50:11,11	<hr/> K <hr/>	least 16:4 29:3
interfaces 51:25,25 54:21	50:18,18 52:16 53:20 56:6,22 57:24	keep 41:2	left-hand 27:2 38:6
interfere 30:24	58:3 60:13 61:14	kilohertz 34:13,21	less 10:6,7,7,8,15,19,19 11:10,13,14 37:7 44:9 45:21 46:7,9 59:25 60:2
interference 31:8	I'll 5:10 22:5 47:16	kin 64:13	let 7:14 10:17,25 11:2 11:22 12:4,21 14:5 16:3 20:7 22:25 23:19 24:11,12 30:8 32:1 33:24 41:15,21 59:21
interfering 31:14	I'm 5:2 7:8 8:15 10:11,17 13:25 14:20 16:2,2 17:1 18:10 20:13 22:9,23 23:22,25 24:2,3,4 27:7,10,17 27:18,22,23 29:13 31:3 32:2,6 33:4,10 37:3,7 38:18 39:5 39:17 41:18 44:12 45:25 47:14 52:15 54:12,23 55:8,8 56:8 57:13 59:19	kind 10:14 27:8 31:16 33:12,19 45:17 52:16	Lett 1:14 3:4,10 4:4,9 12:2 37:22
interrupting 23:25		know 4:16 7:14 8:1 9:18 10:7,10,25 11:2,22 12:4 13:24 14:5 15:2,10,20,21,22,24 16:1,11,14 19:7,11 19:12,20 20:7 21:1 21:3,7,14,20,22,25 22:1,10,13 23:16 25:11 26:25 27:4,6 28:18,22 30:21 32:6 32:6,7,9,10,23 33:10 34:5 35:19,20 41:4 43:11 45:16 48:21,24 51:21 52:19 63:4	let's 4:25 5:1 16:13 24:24 29:14 30:1 31:14,16 34:25 37:2,13,14 38:4 39:22 40:8,22 40:24 41:1,11,23 42:10,11,13,14 52:23 60:12,12 61:3
intervals 20:22			level 39:4,6
into 32:1 57:19 59:3			license 4:2 32:5,9 64:3
involved 51:18			licensed 31:21 32:3
in-band 29:23			licensing 32:6
IPR 8:12,13,18,19,23 9:22 12:11 14:3			
IPRs 4:12 5:6 13:12			
IPR2025-00180 1:10			
issued 64:3			
its 41:8			
itself 42:15 48:7			
it's 4:21 10:4,4 12:24,25			
	<hr/> J <hr/>	<hr/> L <hr/>	
	Jill 4:2	knowledge 63:4	
	Jillian 1:17 2:18 64:18,18	Kronenthal 2:4 4:22 11:24 18:9 29:19 37:12 49:20 58:21 61:13,23 62:6	
	Jim 30:20		
	joint 26:18		
	July 1:16		
	just 4:18,23 7:20 10:16		

like 9:24 10:11 15:10 19:5 21:4 22:10 23:15,16,17,19 26:5 26:8,8 27:8,11,12 28:6 29:21 30:24 31:11,12,13 33:10 33:19 35:19 36:6 37:5,11 48:24,24 49:8 51:23,23 53:20 61:15	28:24 lots 51:25 loud 4:24,25 low 25:6,16 LOWENSTEIN 2:7 low-pass 40:23 LTD 2:3	may 6:1 11:11 14:1,7,12 14:15,18 15:23 16:18 17:9 18:4,4 18:18,24 19:8,18,22 19:23 21:8 22:6 29:9 31:12,19 35:16 35:17,18 38:1 42:12 53:22 maybe 10:20 15:21,25 22:5 27:6 30:14 33:2,24 47:14,16 48:23 49:14 52:11 56:10 me 4:17 6:7 7:14 10:14 10:17,25 11:2,22 12:4,21 14:5 16:3 20:7 22:25 23:20 24:11,12 29:2 30:8 30:17 31:5 33:2,24 34:13 41:15,21 59:21 64:7 mean 8:13 14:24 15:7 16:10 20:9 21:11,19 22:9 28:21 32:25 33:7 34:9 36:12 51:11 52:15 means 28:22 32:24 36:6 meant 6:8 measurements 19:9 meet 6:13,17 meeting 6:20 megahertz 20:10,13,22,24 21:6 21:15,21,21 22:1,11 22:20 23:4,6 24:23 25:6,7,8,14,16,20 25:22 26:1,1 30:17 32:24 33:12,14	34:13,14,22 35:1 39:20,21 40:6,7,8,9 40:12,16,18 41:13 41:25,25 42:5,9,18 42:20 43:9,11,13,16 43:16,20 44:23 45:5 48:2,5,6 57:23,25 58:5 megahertz-wide 22:3 34:4 microprocessor 51:18 middle 40:6 might 27:14 28:16 36:13 37:6 42:6 military 30:25 31:22 minutes 37:8,12 missed 10:11 13:18 45:25 mistaken 17:19 mistakenly 18:21 mixer 56:16 modern 23:18 modulated 35:7 moment 52:23 Monica 2:8 more 11:10 17:24 19:18 22:25 30:22 46:16 50:14 59:13 morning 4:1,9,10 most 16:8 Mr
line 11:14 25:5 lines 14:7,16 list 6:10 13:2 48:24 listing 7:22 little 4:18 18:12 54:12,13 58:23 LLC 1:4,7 LLP 2:7 local 28:10 located 50:25 51:7 52:4 logic 46:12,17 47:2,8,21 50:9,22,24 51:1,5 52:3,7 53:11 long 10:25 18:11 look 9:25 23:19 31:1 42:13,14 51:16 59:2 looked 8:5 13:23,24 looking 10:4 24:1 33:11 lost 18:11 lot	M m 11:8,10 38:21 59:24 60:22 machine 64:7 made 47:6 49:6 make 10:16 19:9 22:17 30:23 37:14 41:24 60:12,12 makes 22:7 46:25 many 6:17,19,23 35:20 mapping 56:4 mark 11:17 13:7 marked 8:10 11:19 13:13 markings 36:8 materials 6:7,9,10 7:21,25 9:7 mathematical 10:7 matter 28:8,9 63:3 64:6 matters 63:4,5	may 6:1 11:11 14:1,7,12 14:15,18 15:23 16:18 17:9 18:4,4 18:18,24 19:8,18,22 19:23 21:8 22:6 29:9 31:12,19 35:16 35:17,18 38:1 42:12 53:22 maybe 10:20 15:21,25 22:5 27:6 30:14 33:2,24 47:14,16 48:23 49:14 52:11 56:10 me 4:17 6:7 7:14 10:14 10:17,25 11:2,22 12:4,21 14:5 16:3 20:7 22:25 23:20 24:11,12 29:2 30:8 30:17 31:5 33:2,24 34:13 41:15,21 59:21 64:7 mean 8:13 14:24 15:7 16:10 20:9 21:11,19 22:9 28:21 32:25 33:7 34:9 36:12 51:11 52:15 means 28:22 32:24 36:6 meant 6:8 measurements 19:9 meet 6:13,17 meeting 6:20 megahertz 20:10,13,22,24 21:6 21:15,21,21 22:1,11 22:20 23:4,6 24:23 25:6,7,8,14,16,20 25:22 26:1,1 30:17 32:24 33:12,14	34:13,14,22 35:1 39:20,21 40:6,7,8,9 40:12,16,18 41:13 41:25,25 42:5,9,18 42:20 43:9,11,13,16 43:16,20 44:23 45:5 48:2,5,6 57:23,25 58:5 megahertz-wide 22:3 34:4 microprocessor 51:18 middle 40:6 might 27:14 28:16 36:13 37:6 42:6 military 30:25 31:22 minutes 37:8,12 missed 10:11 13:18 45:25 mistaken 17:19 mistakenly 18:21 mixer 56:16 modern 23:18 modulated 35:7 moment 52:23 Monica 2:8 more 11:10 17:24 19:18 22:25 30:22 46:16 50:14 59:13 morning 4:1,9,10 most 16:8 Mr

3:4 4:8,9,22 5:3 11:21,24 12:3 18:9 18:13 29:19 30:7 37:10,12,14,21,22 49:20,22 55:13 58:21,24 61:13,20 61:23 62:2,6 MSOs 31:17 much 8:8 11:15 36:17 37:9 37:10 62:2 multiplexing 51:24 multiplied 39:10 40:11 multiplier 39:9 40:23 multisystem 31:5 must 10:11 my 4:1 6:6,9 7:16,19,19 7:23,24 10:10,18 11:6 12:5,25 13:19 16:3 17:25 22:5 25:11 31:3,19 33:24 34:11 38:20 45:14 48:23 49:1,14 52:11 53:11 56:3,12,13 58:16 60:8 63:4,5 64:9 myself 9:13 <hr/> N <hr/> n 2:1 3:1 11:8,10 38:21 60:1,22 name 4:1 12:15 NCO 40:10,23 necessarily 19:8 21:17 36:19	54:19 55:2,15 need 4:18,19 8:6 10:24 19:14 40:7 55:15 56:19 62:4 neither 9:14 64:12 network 15:2 28:6 29:4 30:5 31:11 networks 14:10,21 15:17 never 36:24 48:16 49:10 next 56:17 no 1:17 5:4,14 6:3 8:11 13:25 18:6 20:18 26:1,14 29:12 37:25 44:8 45:20 61:21,25 nomenclature 20:12 34:18 nor 64:12,13 normal 33:20 34:5 North 20:23 22:2 26:20 not 4:25 5:18 6:1 7:7,8 10:5 13:4,21,25 14:12 15:3 16:2,12 17:9 18:1,2,4,19,23 18:24 19:3,7,16,22 22:6,9,22 23:11 24:4,5 26:6,7,13,14 28:8,23 29:14 30:15 31:5,23,25 32:9,10 32:21 33:4 35:18 36:25 44:5 45:15 48:7 49:3,4,8,10,13 49:14,15,17,18,24 49:25 50:11 52:11 52:15 53:20 54:23 55:2,14,20,22 56:12	57:10,17 58:7,12,17 58:18,19 59:7,19 notes 7:9 notice 1:18 9:23 November 38:15 now 7:12 14:1,15 18:1,7 18:23 19:23 25:5 26:18 29:13 34:8,24 35:9 38:1 39:2 40:2 41:4 42:10,11 43:3 43:7 50:4 52:3 53:22 61:3 number 4:2 11:18 13:6 24:8 26:19 28:20 32:15 34:4 44:10 50:19 52:8 57:5 59:25 60:1 numbers 4:15,16 5:9 24:16 25:6 29:10,11 numeric 39:7 40:2 numerical 29:2 NW 2:3 <hr/> O <hr/> oath 5:16 Objection 18:9 29:19 49:20 58:21 61:13 obvious 9:25 10:4 occupy 44:22 off 17:25 37:17,18 Offer 27:17,20,20	OFFICE 1:1 off-air 27:7,9,11,15,21,24 28:1,3,17,23 Oh 4:24 11:4 23:21 42:7 okay 4:23,24 5:1,2 6:4 7:14 9:1 10:17,22 11:4,7,20 12:2,6,20 13:10,15 14:4,6 16:22 17:23 18:1 19:23,25 20:6,12 21:11,20 22:15 24:14,15,19,20 25:15,18 26:10 27:1 32:12 34:18 37:3,7 38:3,5 39:13 42:2,7 42:10,11,16 46:19 46:25 50:4,16,21 51:10 52:25 53:25 54:4,14 55:14,25 56:24 58:6 61:6,7,8 61:22,23 on 1:14,16 4:19 7:24 8:3 9:16 11:23 12:13,17 12:22 15:7,20,22 19:16 20:16,20 21:16,22 24:5,15,16 25:1,11 26:12,15 27:1 28:15,17,18 29:1 30:23 32:8,12 32:17 33:16,22,23 34:1,24 37:19,20 38:6 44:9 45:14,19 47:19,23 48:22 49:13 52:1 56:3 57:25 58:17 59:15 60:15 once 35:13 one 7:20 9:14 10:2,3,5,6 11:10 17:13,22,25
--	--	---	--

18:19 19:13 21:10 23:17 28:21 30:1,11 40:22 45:11 47:10 48:2,11,20,21 49:11 49:12 60:24 61:16 ones 9:14 35:23 36:13 46:23 48:12 49:6 only 17:25 35:23 oops 10:11 open 11:25 operator 15:9 31:4,6 33:22 opinion 32:25 33:8 opinions 9:8 opposed 22:8,18 27:15 or 4:13,23 9:21 10:3,8 10:15,19,19 11:10 11:11,14 14:10,20 15:3,23,23,24 17:14 17:14,15,17 18:4,21 19:3,9 21:2 22:16 22:22 23:11 24:5,9 27:12,13,13 28:6,17 28:23 30:10,11,22 31:8,12,16 32:9,14 32:18,22 33:2 34:13 35:17,24 36:11,14 36:16 46:24 49:10 49:15,16,17,24 50:2 50:19,20 51:24 52:2 52:5 53:14,21 54:16 54:21 58:9,13 59:13 59:25 60:2,9 61:10 63:5 order 9:8 36:18 oscillator 39:8 40:3	other 6:7,9 7:1 9:7 10:3,6 14:12 17:8,15,23 18:3,6,15,24 19:4,9 21:3,5,8 22:16 24:12 26:4 27:12 29:21 30:24 31:9 32:4 33:20 34:5 47:15 50:15,19 60:17 otherwise 15:20 49:16 our 6:20 31:9 37:6 out 7:20,22 27:18 32:1 36:15 40:9,11 41:8 41:8,19 output 11:9,11 39:11 40:5 40:16 42:3,9,23 44:18 52:19 54:15 54:20,21 55:3,16 57:2 58:10,15 59:4 60:25 outputs 45:14 48:4 out-of-band 29:23 30:1 over 10:10 14:10,10 15:1 15:10,12 27:14 28:4 28:11 31:23 41:3,3 Owner 1:8,15 2:6 <hr/> P <hr/> P 2:1,1 page 3:3 11:6 12:13,13 24:1,3,6,15,16 25:1 26:12,15,21 29:1 32:12,17 33:16,23 34:1,24 39:14 56:3 pages	7:19,21 12:17 24:7 Paragraph 20:1,2,3 34:11 42:13 parallel 51:24,24 54:16,21 Parham 2:8 part 7:19 8:15 28:15 31:19 34:5 45:25 58:9,13 particular 14:25 41:7 45:12,18 46:5 47:5 48:12 51:19,20 parties 5:6 64:13 pass 60:18 passed 59:15 past 47:14 patent 1:1,2,8,11,15 2:6 9:5 9:5 14:2,8,16 21:12 26:24 36:4,7,24 44:11,11 53:23 55:9 55:10 56:5,13 patents 21:23 22:20 23:3 33:1 pattern 15:24,25 16:19,22 17:4 18:3,19 patterns 17:9 PBS 27:13 PDF 24:3 penalties 63:7 percent 16:12,14,15 perform	48:8 perhaps 13:18 34:6 61:14,16 perjury 63:7 personal 64:9 personally 31:5 petitioner 1:5 2:2 61:25 Phonetic 30:20 pick 40:10 Pico 2:7 places 12:14 15:13 44:10 50:15 51:9 please 4:3 7:14 10:23 11:1 11:22 12:4 14:1,5,7 14:15 17:2 19:23 20:7 38:1 42:12 51:10 53:22 57:14 plenty 19:19 plus 58:13 point 10:14 23:9,13 31:3 32:7 51:20 52:12 56:22 portion 52:5,6 53:14,15 POSITA 15:19 16:14 25:11 27:5,14 28:16 50:23 51:5 possible 48:15,18 practical 32:7 prefer 29:14
--	---	---	--

preparation 6:11,14,20 7:2,5	11:16 23:11 28:5 45:9 61:15	ready 49:1	referred 10:2 33:1
prepare 6:4 7:9 9:4	puts 58:2	realize 5:15	referring 8:19 13:8 25:3 26:23 26:24 29:3,8
press 4:19,23	<hr/> Q <hr/>	really 4:24 8:5 11:4 13:24 15:10 18:10 25:13 28:18 49:10	reflected 13:21
pretty 23:21 51:8	quadrature 56:16	REALTIME 64:19	regarding 5:19 37:23
previously 41:6	question 15:14 16:3 17:2 18:11 22:5 32:11 33:24 49:14,21 50:3 52:11 53:11 54:23 56:12,13 58:11,16 59:21 60:8	reason 6:1,3 15:21 16:18 19:9 20:18 31:7 52:20 55:19 61:1	related 4:17 5:6
printed 7:16,20,22 24:5	questions 5:12,23 10:24 12:5 61:21,25 64:8	recall 4:14 5:8 7:3 29:7 39:13,14 43:7 53:1 53:5,9 59:1	relates 56:12
printouts 7:18	quick 11:5	receive 15:3,11 19:14,16 28:11	remember 4:15 9:17 10:9 25:13 29:11 30:3,25 41:18 41:20
prior 9:6 13:12	quickly 11:4 23:21 45:13 49:1	received 28:14	remembering 9:14
probably 6:24 17:24 19:4,21 28:7 30:19,25 41:18 49:9 51:17	quite 8:15 22:6,23	receiver 35:13	repeat 17:2 46:1 49:21 57:13
problem 17:14,15,15 19:8	quote 14:9,17,21	receives 35:13	repeated 40:20
proceedings 64:6,11	quoting 34:16	reception 17:14	rephrase 54:24
process 5:13,24 9:12 40:20 56:22	<hr/> R <hr/>	record 8:3,6 37:17,18,19,20 46:24 49:17	Reporter 2:18 4:1 37:17,20 62:4 64:2,19
produce 39:11	R 2:1 64:1	recorded 49:15,24	represent 12:8 13:15
pronouncing 14:20	radio 33:13	reduced 64:8	represents 64:10
provide 6:2 18:18 51:3	raise 4:3	refer 8:18 14:1,7,15 19:23 21:14,15 33:2 38:1 42:12 53:22	requirements 22:15
provider 49:7	ran 27:23	reference 30:19 34:16,21	restricted 43:11
provides 39:10 53:19	range 20:13 33:12,13 34:12 34:19,22 41:16	referenced 13:1	result 64:14
PT 1:17 37:18,19 62:8	read 41:19 63:3	references 9:6	resulted 18:5
pull 8:7	reads 14:8,17		review 7:6 10:10,23 11:2 13:11
purpose 45:10 56:1,7,10,14			reviewed 6:25
pursuant 1:18			
put			

reviewing 10:25 11:3 RF 14:17 21:11,13 32:13 32:18,22,25 33:7,14 33:17,20 34:2,3,8 34:12,19,22 38:6 43:23 44:9,15 54:6 56:4 right 4:3,21,21 7:12 8:2 10:5 15:8,13,13 16:13 19:2,6,13,21 20:25 22:12,20 23:16 24:5 25:2,4 25:24 28:11,12,24 30:1,12 32:16 33:20 33:23 35:20,22 36:22 38:16 39:4 40:6,9,19 42:22 43:6,14,21 44:21,24 45:15 46:5 47:20,25 48:3,25 49:9 53:10 57:8,23 59:6,18 60:12 route 51:15 RPR 2:18 64:18 <hr/> <p style="text-align: center;">S</p> <hr/> s 2:1 64:18 said 27:5 29:9 34:8 41:17 60:11 64:11,11,14 same 5:6 14:16 28:6 31:20 36:13 40:20 44:22 56:6 58:2,3 60:13 60:14,14 63:4 Santa 2:8 say 6:8,10,22 8:13 9:14 9:15 10:5 15:8 16:4	16:13 17:1 19:2 20:2 21:20 22:25 23:12 29:15 31:14 31:16 33:16,25 34:25 35:21,21 36:23 41:11 43:25 45:4 48:9 61:15 saying 20:19 32:2,22 41:2 says 11:8 20:10 24:4 49:7 schematic 51:12 53:21 screen 15:23 17:17,17 search 10:18 second 11:13 34:10 section 7:21 sections 9:16 see 10:17 11:25 12:13,16 14:13,22 19:15,16 23:20 24:9,11,13,14 25:19 27:1,25 31:2 35:2 37:15 38:6 42:17 51:13 54:7,10 54:17 seems 24:8 25:8 select 11:24 45:11 49:6,11 50:9 52:8 53:11 55:3 57:5,22,24,24 58:3,6 59:9 selected 11:9 35:16 36:11,15 46:13,20 47:23 48:16 52:13 57:10 57:17,20 58:18 59:16,20 60:7,9,10 60:16,22 61:10,11 61:18	selecting 36:14 47:4 49:10 50:24 51:6,18 52:3 52:7 59:14 60:13 selection 47:1,2,6,10,12,19,23 48:10 49:5 53:7 59:12 selector 38:21 45:6,9 47:7,8 47:24 48:7,14,23 50:4,9,17 52:5,16 53:8,14,14,16 54:20 55:2,16,20,23 58:1 58:6 59:9 60:17 61:2 selects 38:21 45:7 46:23 50:5 send 55:4 sent 15:1 28:22 45:24 46:3,10,14,21 47:11 47:18 50:6 53:7,12 57:10,17 59:10 60:23 sentence 14:8,17,22 22:24 separately 7:20 serial 51:24,25 54:16,21 service 49:7 services 21:3,8 26:5,9 30:24 sessions 6:11 set 39:23 40:3,14 sets 39:8 set-top 30:2 seven	37:14 several 7:18 sheet 13:9,13,22 shifts 56:15 shorthand 64:2,7 should 10:3 11:14 show 44:8 56:3 showing 24:23 34:3 45:3 50:7 shown 50:11,11 53:20 55:2 shows 36:7 51:1,2 53:4 sic 49:17 53:23 side 27:2 38:6 sign 9:1 11:13 signal 14:18 15:12 17:14 18:19 22:22 31:9 38:7,10,15 40:5 42:9 43:4 44:5,16 53:2 54:6 56:21 58:19 signals 21:16 26:4 51:15 signature 12:14 signatures 12:17,18 similar 26:25 55:16 similarly 36:10 Simultaneous 55:7 since 13:23
---	--	--	--

sitting 18:1,7,23	44:17 46:5,16 49:3 49:11 59:7	6:18 7:10 12:21 44:3 45:22 46:10 49:16 50:22	surprising 11:5
situation 60:21 61:3	specifically 20:1 50:8	structure 26:22	switch 45:14,15 49:1 58:2
slash 50:17	specifying 26:19	studied 9:5,6,7	switches 51:14
slot 22:13,20 23:2,6,11 29:21 30:4 32:15,20 32:21,24	spectrum 14:11 34:15 36:15 52:9 56:15,21,24 57:1,6,11,18,21,23 58:4,7 59:3,14,16 59:17,20 61:11,19	studying 6:6	switching 51:3
slots 23:4	speed 10:20	stuff 52:1	sworn 4:5
softer 54:12	spend 6:19	submitted 8:12,22 12:9	symbol 10:7,18
some 6:6,11 7:1 8:4 9:7 11:11 13:18 16:18 17:15 19:9,9 22:9 22:10 31:6,22 48:15 51:13 52:12 53:19	spent 6:6	subscribe 28:13	synonymous 27:7
someone 19:5	spread 25:7	subscribed 49:9	system 14:20 15:9 17:15 26:11 27:8 28:15,23 29:15,15,16 30:10 30:14 31:25
something 15:24 16:11,13 26:25 27:12,13 28:3 31:13 31:14 49:13	stage 56:17	subscriber 36:11,12,16,18 41:5 46:23,25 49:6	systems 16:5 17:6 29:20 30:13 33:6,7
sometimes 15:22 27:4 29:22 30:19	stand 41:15	subscribers 15:2,3	<hr/> T <hr/>
somewhere 30:3,4	standard 22:16 26:18 62:7	subset 59:23 61:4	T 64:1,1
sorry 5:2 8:15 16:2 17:1 18:10 20:14 22:23 23:25 24:2,3 27:17 27:18,22,23 38:18 39:5 41:18 45:25 47:14 55:8,8 56:8 57:13	start 23:8,12 24:22 25:14 38:4 42:11	substance 5:19	table 25:2,5,10 26:3,8,12 26:14,15 29:1 32:16 32:17 33:11,16 34:1 34:5,24
spaced 20:21,24 21:6	starting 8:1 34:12	substantive 9:21	take 5:10 37:5 42:10
speak 5:19 37:23	starts 22:9 25:22	such 19:13 22:15	taken 1:14 64:7
speaking 35:4,15 43:8 55:7	State 64:4	Suite 2:3	takes 48:3
specific	stated 34:12 63:5	supervision 64:9	Taking 1:18
	States 1:1 20:23	support 52:21 55:11	talk 25:12 27:8 28:8
	step 52:23	supposed 32:1	talked 51:21
	still 15:3 34:24	sure 8:17 10:16,21 16:2 22:9 24:4 29:14 30:23 33:4 37:7,9 46:18 52:15 54:23 56:9 58:25	talking 15:1 21:23 22:2,21 23:4 24:25 25:14
	Street 2:3	surprised 23:22	
	strike		

27:7,11,19 30:4 32:23 33:5,9 47:3 47:14 54:12 60:21	testimony 6:2 11:1 12:20	12:14 15:13,21 16:25 17:8,13,24 19:4,11,19 20:25 21:2,3,7,8 22:15 23:15 25:2,6,6,25 26:4 30:3 31:1,8 32:9 35:20,21,21 37:3 44:2,3,4 47:8 49:1 50:14,14 51:13 51:25 54:5,9,14 55:1,15 56:19	22:21,25 23:2 26:5 27:5 28:24 29:8 32:10 33:9,9 35:12 36:4,21 37:1 42:6 43:18 49:7 50:2 51:1,8 52:15,16 53:17 54:12 55:5,9 55:9 61:16
talks 36:10	than 10:6,7,8,8,8,15,19,19 11:10,13,14 17:9 18:3,15 30:22 37:8 44:9 46:7,10 59:25	therefore 55:21 59:15	this 4:12 6:16,23 8:12,13 8:18,23 9:22 12:8 12:13,17,20,22 13:4 13:7,23 14:2,25 15:17 16:24 23:3 24:20,21 25:9,12 26:3,8,14,25 29:10 30:19 33:19 34:5,20 43:2,6 44:17 45:17 45:21 46:5 48:6 50:11,12 51:3,12,15 51:22 52:17,21,21 53:4 55:11,18,21 57:23 59:21 60:11 60:25 61:17 63:9
target 39:12	Thank 4:9 5:11 8:8 10:13 11:15 12:7 15:15 20:6 21:9 22:4 36:17 37:15 38:20 60:3,5 62:2,3	therein 63:5	those 4:15,16 6:23 8:7 9:8 9:24 10:9 15:2 21:4 24:7 26:9 27:2,15 30:18 31:4,9,15,18 32:1,3,8 33:17 36:9 41:2 43:10 44:22 45:11,12 47:4 57:22 57:24 58:17 60:16 63:5
technical 17:18 18:5,20,21 19:8	that's 4:24 10:22 13:5 17:22,24 19:20 20:15 22:12,12 24:5 24:5,18 25:4,13,16 25:24 26:3 28:4,8 28:10 30:14 31:13 31:14 34:16 35:10 35:12 36:22 37:1 38:16 39:4 40:19 41:9,14 42:14,22 43:6,14,16,21 44:21 44:24 45:5 46:5 47:20,25 50:7 52:1 53:4,10 57:7 59:6 61:16	thereto 64:8	though 28:16,17 29:23
technology 23:19	them 7:20 8:7 10:1 15:3 19:20 21:16 23:5 35:22,23 36:8 42:8 48:22 55:4 63:5	these 21:23 22:19 23:3 24:20 29:24 35:19 40:22 45:14 48:20	thought 17:25
television 14:9,18,19 15:17 16:5 17:6 21:16,23 22:22 23:18 26:3,10 29:4,15,16 30:10 33:5,6	then 7:18,22,24 9:6 11:25 11:25 13:12 14:15 16:23 17:5 19:6 21:7 25:19,22 28:5 28:13 32:4 35:13 37:2,6 38:24 40:20 42:10 45:6 46:25 50:6 51:17 53:18 54:9	they 8:2 19:6,8 21:6,14,15 21:25 23:5 29:11 30:13,13,15,15,17 31:6,7 32:8 43:12 48:25 51:8,9 52:20 57:20 60:2,2,9,24 61:10	three 4:11 5:5 41:3
televisions 27:14 28:5	there 6:1 8:4 11:13,24	they're 8:6 9:25 22:21 26:7,8 34:3 35:17 57:20	through 7:21 8:4 11:9 14:17 18:21 24:24 31:10 34:2,25 38:14,22,22 38:24,25 40:21 41:14 43:23 44:6,14
tell 23:15		thing 36:13 45:17 58:2 60:13,14	
ten 6:24 36:7		things 10:20 23:11 29:21 31:4,6 34:6	
tend 32:9		think 6:15,15 8:2,5,6 9:24 9:24 10:2,19 13:18 15:14,19 16:7,14,25 17:8 18:11 19:2,18 19:19 21:15 22:19	
term 19:21 32:17 58:14			
terminology 29:14			
term's 33:3			
terrestrial 14:19			
terrestrially 28:4			
test 15:24,25 16:19,22 17:4,9 18:3			
testified 4:6 6:25 16:18 18:15 47:17,21 53:5 59:1			
testify 4:17			
testifying 5:15			

44:19 45:7,8,18 46:14,20,21 47:4,11 47:13,18,22 48:1,13 48:16,22 50:5,6,10 50:10,24 51:4,6 52:4,7,12,13,19 57:2,9,16,21 58:8 58:10,15,17 59:5,12 59:13,23,23 60:18 61:9,10,11,18 throughout 52:1 time 6:6 9:13 10:12 13:23 16:12,14 26:17 41:21 45:12,18,24 46:3,9,15,22 47:5 48:12 51:20,23 52:5 53:7,12,15 times 9:16 43:15 titled 32:13 today 5:13,20,24 6:2,5,14 6:21 7:2,6 together 27:24 40:11 top 11:8 13:1 17:25 37:15,16 total 6:17 TRADEMARK 1:1 transcript 12:24,25 13:11,21 64:6,10 transmission 34:23 35:6,10 transmit 30:1,16,18 31:4,6,13 31:18 32:8 transmits 38:24 transmitted	27:13 31:23 35:5,8 53:2 transmitting 15:4 29:17 34:7 TRIAL 1:2 trouble 54:13 true 63:4,5,7 64:10 try 5:1 9:24 turn 4:18 24:11,12 two 10:9 18:17,20 two-day 12:11 typically 18:17 typographical 9:21 10:15 typos 9:23,25 10:9 <hr/> U <hr/> UHF 14:18 20:9,10,14,21 undefined 29:5 under 5:15 63:7 64:9 undersigned 64:2 understand 5:21 10:16 16:20 22:23 24:25 36:1,6 36:12 39:18,25 50:23 51:5 54:23 56:11 61:24 understanding 12:23 15:16 40:13 understood 11:15 16:2 34:20 unextracted 59:10	United 1:1 20:23 unless 19:15 up 4:18 8:7 10:20 27:2 31:1 upconverted 35:5,11 upon 10:10 63:5 64:11 upside 24:12 us 9:15 12:9 56:16 use 4:22 26:9 29:14 36:18 38:18 39:17 39:19 41:5 52:16 58:14 used 10:6 28:20,24 30:10 33:3 36:11,11,16 49:16 51:3 user 11:11 35:16,24 36:2 47:9,12,19,23 48:17 49:3,25 user-selected 47:10 uses 32:16 37:1 43:10,12 using 32:18,20 <hr/> V <hr/> v 1:6 valid 64:3 value 40:10 verified 5:9 very 8:8 11:8,15 26:25	30:21,22 31:7,7,10 31:15,16,17 36:17 45:15 62:2 VHF 14:18 via 1:15 videoconference 1:15 view 23:7 32:7 voice 4:19 volume 4:18 <hr/> W <hr/> W 2:4 wait 62:6 walk 24:24 Walscor 30:20 want 11:1 19:8 28:11 30:23 37:7 40:5 41:21 45:4 48:10 51:19 52:20 56:21 wanted 19:5 30:14 58:3,3 wants 46:24 was 4:6 6:15,15 8:22 9:12 11:19 12:9 18:10 19:15 26:17,18 27:12 29:8,25 30:5 31:8,8 32:9 33:19 34:4 35:24 43:19 49:8,14 52:11 56:12 56:13 60:24 64:7 Washington 2:4 wasn't
--	--	--	---

13:19	9:15	23:10,11,13 25:5	36:7 37:7,23 38:4
waste	were	26:1 29:22 31:11	49:11 53:19 54:15
41:21 49:12	4:11 5:5 6:7,23 7:7	33:2 46:12,16 47:1	56:17 58:12 59:12
watch	13:16 18:18,19	47:21 50:8,21,23	59:19 60:6,25 61:24
35:25 36:3 46:24	20:24 21:6,7,25	51:1,5 53:17 56:22	within
47:5 49:3,13,17	27:19 29:11 30:13	60:21,22 61:4	19:12 51:15 63:3
watched	30:15,18,22 31:6,7	wherever	without
49:15,24	31:16,17 32:8 34:6	8:1	15:22 17:19 18:6,22
watching	64:8	whether	34:5
35:24,25 36:3	we'll	15:2 21:1 28:23 32:9	witness
way	28:8	49:9 60:8	3:3 4:23 11:20 12:2
19:2,13 24:12 27:5	we're	which	18:10 29:20 37:13
30:11,15 37:1 47:17	21:23 22:2 23:3 33:9	7:21 9:14 11:4 14:2	49:21 55:8 58:22
51:13 53:6	47:3 49:13 60:13	18:3 21:13 24:1	61:14 62:3 64:11
ways	we've	27:18 29:11 35:10	word
28:21,25 51:15	37:4	39:8,19,23 40:15,15	5:10 27:18 32:18
we	what	41:24 42:24 46:13	38:18
8:6 9:15 11:17 13:7	4:19 6:4 7:14 8:3 9:3	46:19,23 47:18,22	words
19:18 24:25 25:1,12	9:18 10:25 11:2,23	48:10,11,12 49:6	18:16 27:12 60:17
25:13 28:5 29:22	12:22 14:24 16:10	55:11,19 56:17 57:4	work
31:16,16 33:4 36:13	20:2,9,15,18 21:11	58:4 59:4,24 60:1	29:2
37:14 39:14,19 40:5	21:22 22:7 24:25	61:1 63:4	worries
40:6,7 41:6 42:8	25:2,9,13,15 26:15	whichever	5:4 29:12
43:7 47:14 48:10	29:14 31:1,17 32:2	48:4	would
49:12 51:14,19	32:25 33:7,19 34:8	who	4:2 6:10,22 7:14 9:14
52:14,23 53:1 61:14	34:9 36:5 38:18	9:18 15:5 23:13	9:15,25 10:14,20
62:6	40:2 41:18,19 45:10	why	15:11,19 16:15,23
WEATHERWAX	45:13 48:18,18,21	6:1 18:18 56:19,19	17:11,13,17 19:7,14
2:7	50:7 53:4 56:1,6,7	will	19:16 22:17 23:7,13
week	56:10,13	8:19 11:17 13:8	27:5,13 28:3,7,14
6:15,16,23	whatever	wire	29:18,21 30:1,21
weeks	23:5 26:9 30:13	34:23	31:1,6 36:21,24
10:10	35:17 48:25	wireless	37:5,11 40:2 41:24
welcome	what's	34:23	42:4 43:25 48:9,16
37:22	24:5 50:19	wires	48:21 49:4,9,10,18
well	when	31:25	49:25 50:21,23 51:5
14:22,25 15:7 16:11	6:13 8:13,18 9:25	wishes	51:8,10,13,18 52:3
21:5,12 23:15 26:7	10:24 11:22 12:4	41:5	52:13 55:24 56:19
26:17 27:4 30:12,21	14:5 20:7 23:12	Witcoff	wouldn't
31:23 32:22 33:9,19	27:7 28:13 32:16	2:3 6:12	29:16 35:22 49:12
34:20 37:9 40:22	34:8 35:4 40:10	with	writing
41:9 43:25 45:3	46:25 47:3	4:11 5:5,19 6:11,13	64:8
48:3,9 49:5 50:18	where	6:20 7:2,5 8:1 9:3	written
54:10 57:4 59:12,24	10:16 12:14 16:13,17	12:10,14 23:8,12	26:17
62:1	17:9,18 18:4,20,24	24:22 27:7 28:11	wrong
went	19:11,19 21:3,7	29:3,23 30:24 31:14	29:9

X	26:22 36:10 37:2	1002	8:4
X	38:1,4 39:2,7 40:14	7:7 8:14,23 9:11,22	198
3:1	40:21 41:11,23	1013	32:24
Y	42:11,13,15,17 43:8	7:17 19:24 20:3 37:2	2
yeah	43:15,19,22 44:2,4	38:2	2
4:22 5:9 7:16 17:17	44:13 45:6,9 46:19	1016	10:2 12:13,17 14:16
23:8 24:3,11,14	47:1,9,17,17,21	2:7	14:16 22:11 25:14
27:23 28:3 29:8	48:15 49:5 50:2,4,9	102	25:15,17 36:7 38:4
30:17 36:21 41:17	50:13,16,21,23 52:1	11:6	38:7 41:14,24 42:4
42:7 47:12	52:4,10,20,24 53:6	1033	42:25 48:25 53:23
year	53:17 55:5,11,20,23	23:18,23 24:15 25:1	54:2,5,14,20 55:1
4:13,13 5:7	55:24 56:13,24	26:12,16,21 29:2	55:14
yes	58:14,16 59:2,8,24	32:12,17 33:17 34:1	20
4:17 7:4 8:21,25	61:2,17	34:25 39:14	34:25 35:9,14 39:15
12:16,19 13:4,14	Zhang's	11	39:19,23 40:4,15
14:14 16:21 17:22	7:17 44:11,18 46:2,9	3:9 32:24	45:7,14,23 46:3,7
20:15 24:18 25:21	46:12 55:16 56:5	11,785,275	46:13 53:1,6,12
26:24 35:3,7,12	57:16 60:17 61:9	1:11	59:23 61:10 63:10
37:1 38:8,12,20,23	Zoom	1100	20005
39:1,16 40:1 43:2	1:15	2:3	2:4
43:18 44:17 46:8	0	12	2012
50:7,14,20 53:4	0	7:22	3:9 11:17,18 13:3,5,8
54:8,11,18	40:5,9,11,17 42:5,9	1200	13:9,13,15,22
your	44:23 48:2	2:3	2024-00432
4:3,19 5:10 6:2,14,25	1	13th	12:12
7:2,5,7 9:3,4,10,21	1	2:3	2024-432
11:1 12:15,18,20,22	8:4 14:7 16:14,15	14603	5:7
13:12,16,20 15:14	21:21 25:6,12 34:1	1:17 4:2	2024-435
17:2 18:15 20:16,20	38:14 40:14,17	15	4:12
22:23 23:7 28:15,15	41:12,16 44:6 53:23	6:22,22 37:8	2025
32:25 37:24 41:21	53:24 59:22	15-minute	1:16
58:11,14 61:24	1,000	37:5	2025-00180
you'd	34:13	150	8:13,19
35:23 51:11,16,16	10	35:22	204
you'll	34:13,21 39:13	156	32:24
11:25	10:00	34:25 35:9 39:20,24	210
you're	37:19	40:16	42:20 43:16,20 56:5
5:15 7:9 10:25 17:16	10:44	159	220
21:22 24:15 25:2	62:8	40:7	38:9
30:4 54:12 60:21	100,000	162	23rd
61:16,24	34:14,22	35:1,10 39:21,24	1:16
Z	1001	40:16	230
Zhang	7:18 8:1 14:1,16 54:5	174	38:13 39:3 42:25
19:23 20:3,15 21:13	54:14 55:1,15	25:22 26:1,13 29:5	54:9 55:17
		29:17 30:17	234
		18	

33:11,13 34:8 240 33:12,14 38:21 50:17 50:19,20 52:2 26 33:11,11 264 30:10 41:13,25 275 9:5 14:2,8,16 21:12 26:24 36:4,7,24 50:2 53:22 55:10,20 56:5,6 28 42:6 280C 45:3 29 42:4,6,7 <hr/> 3 3 20:10,13 39:2,7,21 39:22 40:8,14,21 41:11,23 42:3,3 30 27:2 34:2 41:12,14 41:24 42:4 300 20:10,13 310 39:8 40:3,23 320 39:9 40:23 321 39:23 330 40:24 35 42:25 43:3,15 44:7 45:8,14 46:7,14 48:16 53:1,13 61:7 <hr/> 4 4	3:4 12:13,17 21:2 25:8 41 42:13 432 4:12 435 5:7 12:12 438 4:12 5:7 12:12 49 34:11 <hr/> 5 5 14:17 21:2,2 48:25 50:16,21,24 51:6,13 51:22 52:4,6 53:20 506 24:9 507 24:10 516 24:3,14,15 25:1 26:12,15,21 29:1 32:12,17 33:16,23 34:1,24 39:14 52 14:7 54 22:11 25:14,15 30:9 41:13,25 540 42:18 44:5 45:1,4 57:23,25 58:5 55 14:8 59 56:3 <hr/> 6 6 10:3 20:1,3,4,5,22,24 21:2,6,14,15,21 22:3,20 23:4,6 24:23 25:16,19 29:6	29:18 34:4 40:6,9 40:12,18 42:5,9,12 42:14,14,17 43:3,9 43:11,13,15,16,19 43:22 44:2,4,8,12 44:13,18,23 45:4,7 45:22,23 46:2,9,12 47:1,7,9 48:2,2,5,6 48:15 50:4,8 52:24 55:24 56:13,24 57:9 57:16 58:14,16 59:2 59:9 61:4,9 6-megahertz 57:5,6 60 22:11 600 20:13 610 56:1,14 630 42:24 44:19 48:11 57:1,12,19 58:9,13 58:19 59:2,8 61:12 61:15 640 45:6 47:6,9,24 48:7 50:4,9,17,20,20 52:2 53:8 58:6,9,13 61:15 <hr/> 7 7 25:22 29:6,18 72 25:7,9 41:16 750 42:18 44:5 45:1,5 57:23,25 58:5 76 25:7,9 <hr/> 8 8 7:21 22:1 88	25:20 26:1,13 29:5 29:17 30:17,17 <hr/> 9 9:00 1:17 9:53 37:18 90405 2:8 986 24:4 99.9 16:12
---	---	--	--