

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4
5 VOLKSWAGEN GROUP OF AMERICA, INC.

6 Petitioner

7 V.

8 CARUCEL INVESTMENTS, L.P.

9 Patent Owner

10
11 Case No. IPR2019-01101

12 U.S. Patent No. 7,221,904

13 and

14 Case No. IPR2019-01105

15 U.S. Patent No. 8,718,543

16
17 VIRTUAL DEPOSITION OF MARK R. LANNING VOLUME 2

18 Friday, June 5, 2020

19
20 Job No.: 300808

21 Pages: 220 - 284

22 Reported by: Judith E. Bellinger, RPR, CRR

1 Deposition of MARK R. LANNING, conducted
2 virtually.

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11 Pursuant to notice, before Judith E.
12 Bellinger, Registered Professional Reporter,
13 Certified Realtime Reporter, and Notary Public in
14 and for the State of Maryland.

A P P E A R A N C E S

ON BEHALF OF THE PETITIONER:

RYAN C. RICHARDSON, ESQUIRE

STERNE, KESSLER, GOLDSTEIN & FOX

P.L.L.C.

1100 New York Avenue NW

Washington, D.C. 20005

202.772.8729

ON BEHALF OF THE PATENT OWNER:

ELVIN E. SMITH, ESQUIRE

LAW OFFICES OF ELVIN E. SMITH, PLLC

307 Dartbrook

Rockwall, TX 75087

972.722.2475

SANFORD E. WARREN, ESQUIRE

WARREN | RHOADES LLP

1212 Corporate Drive

Suite 250

Irving, TX 75038

972.550.2955

1 A P P E A R A N C E S C O N T I N U E D

2

3 ALSO PRESENT:

4 Bridgette Rast, AV Technician

5 Charles D. Gavrilovich

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C O N T E N T S

EXAMINATION OF MARK R. LANNING	PAGE
By Mr. Richardson	225

E X H I B I T S

(Attached to the transcript)

Lanning Deposition Exhibits:	PAGE
Exhibit 7 Declaration	233
Exhibit 8 United States Patent No. 5,276,686	237
Exhibit 9 7-10United States Patent 4,675,863	247
Exhibit 10 United States Patent 5,504,786	265

1 P R O C E E D I N G S

2 MARK R. LANNING,

3 having been duly sworn, testified as follows:

4 EXAMINATION BY COUNSEL FOR THE PETITIONER

5 BY MR. RICHARDSON:

6 Q All right. Good morning, Mr. Lanning.
7 Welcome back for day four.

8 A Thank you.

9 Q And I promise I will do my best to make
10 today the shortest day that we have had so far,
11 but we'll see what we can do.

12 All right. Well, let's dive back in.

13 So Mr. Lanning, I believe at various
14 points during the last couple days of depositions
15 that we've had, you have mentioned that the
16 inventions disclosed in the patents at issue here
17 can perform something called a handoff, correct?

18 A So the challenged patents you're
19 referring to, correct?

20 Q Correct. And we can just focus on the
21 '904, if you'd like, since we were talking about
22 that one yesterday.

1 A Yes, it performs different types of
2 handoffs.

3 Q Okay. And which of the network
4 elements performs the handoff? Is it the mobile
5 unit, the moving base station, or the fixed base
6 station?

7 A It's both the mobile unit and the
8 moving base station, depending upon the situation.

9 Q Okay. So if we had a situation where
10 the mobile unit is connecting to the network
11 through the moving base station, is it accurate to
12 say that the moving base station would be
13 responsible for the handover procedure?

14 And Mr. Lanning, if you don't mind just
15 identifying for the record which document you are
16 consulting.

17 A I'm looking at my declaration for the
18 '904 patent.

19 Q Okay. Great. Thank you.

20 A So the two different handoffs I
21 referred to are, the first type of handoff is the
22 cellular phone that's performing handoffs between

1 a direct connection with the fixed base station
2 and the moving base station.

3 The second type of handoff that occurs
4 is when a cellular phone is connected to a moving
5 base station and then the moving base station
6 performs the handoff between fixed base stations.
7 I think that answers your question.

8 Q Exactly. Thank you.

9 So in the second type of handoff that
10 you just mentioned there, where the moving base
11 station performs the handoff between fixed base
12 stations, if we can focus on that type of handoff
13 for a moment.

14 When you're dealing with that scenario
15 and the moving base station moves out of a
16 coverage area for a first fixed base station and
17 into a coverage area for a second fixed base
18 station, how does the mobile unit become
19 registered with that second base station?

20 A Two or three problems with your
21 question. The first is that the moving base
22 station performs a handoff typically before it

1 leaves one cell -- one cell's coverage area and
2 enters another. The wording that's been used in
3 the patents I've read is when the moving base
4 station gets to the fringe of the cell and
5 realizes it's losing signal, the idea is to do a
6 handoff before the signal is lost. So I'll just
7 make that clarification.

8 The other clarification is terminology,
9 as we discussed yesterday. There is a
10 registration in cellular networks of this time
11 frame, and then there is a location update.

12 The registration that you used in your
13 message -- or in your question I'll need to have
14 clarification for, but let me explain and then you
15 can tell me what you meant by "registration."

16 When a cell phone turns on initially
17 when it's powered up it registers with the
18 cellular network. And the cellular network
19 validates that it's a valid device, the mobile
20 phone being used is valid and the customer that's
21 using the phone is in good standing, as far as
22 paying their bills. All of that validation is

1 referred to in the cellular networks of the 1995
2 time frame as "registration."

3 When a cell phone, or in the case that
4 you just mentioned, a moving base station moves
5 from one cell to another cell in a cellular
6 network, that's referred to as a "location
7 update," and it's just simply a location update
8 telling the cellular network where the mobile
9 phone is at so the cellular network can then
10 locate the phone in the event that it's to receive
11 a phone call.

12 So, now, with all that long
13 explanation, when you said how -- when you asked
14 me how does the cell phone register with the new
15 base station, can you re-ask the question with one
16 term or the other so that I understand what you're
17 asking about?

18 Q Sure. Let me ask it slightly
19 differently and I'll use the wording and the
20 explanation that you have provided in your
21 previous answer.

22 So after a cell phone turns on

1 initially and performs that initial registration
2 with the cellular network as you just described,
3 if the cellular -- excuse me -- if the cell phone
4 remains on and then moves to the fringe of one
5 cell and into another cell, is it your testimony
6 that the cell phone does not need to perform a
7 subsequent registration with the second base
8 station?

9 A Definitely it does not need to do the
10 registration as I just described --

11 Q Okay.

12 A -- as the cell phone or the moving base
13 station moves from one cell to the other. The
14 only thing -- the only function that needs to be
15 performed is a location update.

16 Q Okay. And I think you have your '904
17 declaration in front of you.

18 If you could turn to Paragraph 125 and
19 we referred to this paragraph, I think, briefly
20 yesterday as well.

21 A Okay. I'm there.

22 Q And if you need to take a moment to

1 reorient yourself with the paragraph.

2 But specifically I'm focusing on the
3 language that we looked at yesterday in the middle
4 of this paragraph where it reads, "The Challenged
5 Claims require a cellular phone that is capable of
6 directly communicating with a fixed base station
7 using a standard cellular protocol, communicating
8 with a moving" -- excuse me -- "communicating with
9 a moving base station using standard cellular
10 protocol and is capable of registering with the
11 cellular network."

12 Do you see that?

13 A Yes.

14 Q Is it your testimony that the cellular
15 phone always needs to communicate with the moving
16 base station using a standard cellular protocol in
17 order to meet the Challenged Claims?

18 A It's my opinion that the cellular phone
19 needs to communicate with the fixed base station
20 always using a standard cellular protocol because
21 that would be the protocol that a cellular base
22 station would use.

1 When the cell phone is communicating
2 with the moving base station, it would not always
3 need to use a standard cellular protocol but it
4 still needs to be capable of registering with the
5 cellular network.

6 Q Okay. So the second requirement that
7 you have listed here that we just read of
8 communicating with the moving base station using a
9 standard cellular protocol, that's an optional
10 function, correct?

11 A That's correct. I would say that's
12 fair; that it can be a standard cellular protocol
13 for the communication between the moving base
14 station and the mobile unit or it could be a
15 different wireless communications protocol.

16 Q Okay. Well, I think that we can set
17 the '904 declaration aside and move to your '543
18 declaration.

19 MR. RICHARDSON: And if we can please
20 pull up Mr. Lanning's expert declaration relating
21 to the patent ending in '543; that's U.S. Patent
22 No. 8,718,543.

1 (Discussion held off the record.)

2 (Lanning Exhibit 7 marked for
3 identification and attached to the transcript.)

4 Q And Mr. Lanning, while the document's
5 being brought up on the screen and marked, same
6 script as yesterday, if you don't mind briefly
7 just kind of skimming through and making sure
8 there's no obvious markings, highlights, or
9 annotations.

10 A It's a clean document.

11 Q Okay. Great.

12 MR. RICHARDSON: And, actually, it
13 looks like the document that we have on the screen
14 is just the '543 patent. If we could pull up
15 Mr. Lanning's declaration relating to the '543
16 patent.

17 Q And while that's being brought up,
18 Mr. Lanning, if you don't mind turning to the last
19 page of your declaration and confirming that that
20 is your signature and date.

21 A Yes, it is.

22 Q Okay. Great.

1 And as with your previous declarations
2 that we've discussed, this declaration contains
3 your true and correct opinions, this time as they
4 relate to the Patent No. 8, 718,543, correct?

5 A Yes.

6 Q Okay.

7 MR. RICHARDSON: And if we could
8 minimize the screen a little bit so that Dr. -- or
9 Mr. Lanning could see the entire first -- there we
10 go.

11 Q And can you confirm that the page
12 that's shown on the screen appears to be the same
13 cover page of the document that you have in front
14 of you?

15 A Yes, it is.

16 Q Okay. Great.

17 MR. RICHARDSON: And just a point of
18 clarification for the record, can we please
19 confirm that it's the declaration here that's been
20 labeled as Exhibit No. 7?

21 AV TECHNICIAN: Correct, Counsel.

22 MR. RICHARDSON: Okay. Thank you.

1 We can pull that down from the screen.

2 Q And Mr. Lanning, I'll ask you now to
3 pull out the physical copy that you have of the
4 Ito patent.

5 MR. RICHARDSON: And if we can also
6 bring up the Ito patent, that's I-T-O, which
7 should be in the same folder and it is U.S. Patent
8 No. 5,276,686.

9 Q And Mr. Lanning, while that's being
10 brought up again, can you just confirm for me
11 briefly there's no annotations, markings, or any
12 other types of notation on the Ito patent?

13 A It's a clean document.

14 Q Great. And the physical copy that you
15 have in front of you, at least the first page,
16 appears to correspond to the document that's shown
17 on the screen, correct?

18 A Yes.

19 Q Great.

20 MR. RICHARDSON: Yeah, we can mark the
21 Ito patent that's being displayed as Deposition
22 Exhibit 8.

1 And then we can pull that document down
2 as well.

3 (Lanning Exhibit 8 marked for
4 identification and attached to the transcript.)

5 Q Mr. Lanning, I'm going to direct your
6 attention to Paragraph 94 of your declaration for
7 the '543 patent.

8 A I'm there.

9 Q Okay. And this particular paragraph
10 begins by saying, "The Ito Patent does not
11 disclose a second transmitter of its mobile base
12 device (MSS) of its invention transmitting a
13 cellular signal at a transmission power level
14 higher than the mobile device transmission power
15 level as required by the relevant claims of the
16 '543 Patent nor would it have been obvious for a
17 POSITA to understand, without an explicit
18 disclosure, that it would always be the case
19 because there are situations where it is possible
20 for the opposite relationship to occur regarding
21 the power of both signals."

22 Do you see that?

1 A Yes.

2 Q Okay. Just so that I'm clear about the
3 position you're making in this sentence, you're
4 not saying that Ito does not disclose some
5 situations where it can have a higher power level,
6 correct?

7 A Well, that implies that Ito has a
8 second transmitter. "That" meaning your question
9 implies, first, that Ito has a second transmitter,
10 which I started out Paragraph 94 saying that I
11 don't believe Ito discloses a second transmitter;
12 therefore, you're asking me a hypothetical
13 question about what I believe is a nonexistent
14 transmitter in Ito.

15 Q Okay. So then just so that I'm clear,
16 the point that you're making in Paragraph 94 is
17 not about the transmission power levels, it's
18 about the existence of a second transmitter?

19 A Well, I'm making both. You've read the
20 passage. I'm making both statements here. First,
21 I state Ito -- "The Ito patent does not disclose a
22 second transmitter," as required by the claim, or

1 the claims. In this section I'm referring to a
2 specific language that's there in the Challenged
3 Claims.

4 And then secondly, I'm making an
5 obviousness argument, or an argument against
6 obviousness that a POSITA would understand without
7 an explicit disclosure that this would always --
8 would not always be the case.

9 So, again, the first thing is there's
10 no second transmitter. Then I'm saying it would
11 be obvious to understand, even if there were, that
12 there could be the opposite relationship.

13 Q Okay. So I think that's the point that
14 I was just trying to get some clarification on
15 because when you reread the portion of
16 Paragraph 94 to me, you said, "The Ito patent does
17 not disclose a second transmitter as required by
18 the claim." But the first sentence of that
19 Paragraph says, "The Ito patent does not disclose
20 a second transmitter of the mobile base device of
21 its invention transmitting a cellular signal at a
22 transmission power level higher than the mobile

1 device transmission power level as required by the
2 claims."

3 So are you making two points here or is
4 that a single point? Are you saying, A, there's
5 no second transmitter, period, and there's no
6 transmission of a higher power signal versus a
7 lower power signal? Or are you just saying that
8 there is not a second transmitter that's
9 configured to perform this specific function?

10 A Well, I start out that this --
11 Paragraph 94 is the beginning of a subsection
12 that's labeled "Subsection v," and the subsection
13 heading is "Ito Does Not Disclose or Render
14 Obvious a Second Transmitter Configured to
15 Transmit Cellular Signal at a Cellular
16 Transmission Power Level Higher than a Mobile
17 Device Transmission Power Level."

18 The Challenged Claims, I believe, like
19 the other Challenged Claims we referred to, are in
20 regard to an apparatus that we've commonly
21 referred to as the "moveable base station."

22 In Dr. Ding's deposition he has stated

1 that for the Ito patent the MSS, or the mobile
2 base device as defined by Ito, is the moveable
3 base station or meets the requirements of the
4 moveable base station. Therefore I said in the
5 first sentence of Paragraph 94, "The Ito patent
6 does not disclose a second transmitter of its
7 mobile base device (MSS) of its invention
8 transmitting cellular signal at a transmission
9 power level higher than the mobile device
10 transmission power as required by the relevant
11 claims of the '543 Patent." And I'll stop there.

12 So to answer your question, I'm --
13 Mr. -- or Dr. Ding has identified the MSS of Ito
14 as being the mobile -- or the moveable base
15 station. And so then I've looked at the MSS to
16 see if the MSS has the second transmitter as
17 required by the relevant claims.

18 Q Okay. So let me ask it this way, then:
19 Do you disagree that Ito discloses a second
20 transmitter in general?

21 A That's a different question. I don't
22 know if I've even performed that analysis. I very

1 clearly said that the MSS does not have a second
2 transmitter.

3 Q Yeah, sorry. Let me clarify the
4 question then.

5 Do you disagree that Ito's MSS includes
6 a second transmitter in general?

7 And Mr. Lanning, if it would help, I
8 can ask --

9 A I'm just about there. I'm looking at
10 the details.

11 You're asking a different question than
12 what I covered in my declaration, so I need to
13 review the Ito patent to be able to answer your
14 question.

15 I'm looking at Figure 3 of Ito and I
16 was reviewing some of the associated text for
17 Figure 3. And I believe Figure 3, even though it
18 doesn't have a box that says transmitter, appears
19 to have two different transmitters, one in a box
20 that's labeled "50," and the other box that is not
21 labeled at the bottom of Figure 3.

22 Q Okay. And since we have Ito out in

1 front of you there, just so the record's clear
2 maybe you can turn to Column 7, Line 9. And in --

3 A Okay. I'm there.

4 Q And in this portion of Ito it's
5 referring to Figure 3, which you just previously
6 mentioned and it says, "Figure 3 showing a block
7 diagram of a mobile base device MSS, it comprises
8 a first transmitter-receiver unit 50 and a second
9 transmitter-receiver unit 80. The first
10 transmitter-receiver unit 50 is used for radio
11 communication with the base station BSS it belongs
12 by way of a first radio channel, whereas the
13 second transmitter-receiver 80 is used for radio
14 communication with its portable device PSS by way
15 of a second radio channel."

16 Do you see that?

17 A Yes.

18 Q And so this is more or less describing
19 what you were discussing in your previous answer,
20 correct?

21 A Yes. Other than, as I noted in
22 Figure 3, the box 80 is not labeled. I'm willing

1 to accept the bottom box is box 80.

2 Q Fair enough.

3 If you can flip forward, then, to
4 Column 15.

5 A Okay.

6 Q And if you need to go back a little bit
7 to start from the beginning of this paragraph to
8 kind of orient yourself, that's fine.

9 Here they are discussing the radio
10 signals transmitted over the first and second
11 radio channels that we discussed. And
12 specifically at Line 14, the patent reads, "The
13 power level of the radio transmission signal is
14 amplified by the power amplifier 156 and then sent
15 out to the base station by way of the high
16 frequency switch 157 and 158" -- excuse me -- "157
17 and the antenna 158. The power level of the
18 signal coming out from the power amplifier 156 is
19 set to a relatively high value because of the long
20 distance that normally exists between the mobile
21 base device and the base station."

22 Do you see that?

1 A Yes.

2 Q So is it logical to read that text in
3 that paragraph of Ito to say that the power level
4 being transmitted from the MSS to the BSS has a
5 relatively higher power level than that received
6 at the MSS from the PSS?

7 A The passage you read from, Column 15,
8 is referencing an initial setting for "the power
9 level of the signal coming out from the power
10 amplifier 156," and it's setting that power level
11 initially at a relative high value because of the
12 long distance that, and the key word here
13 'normally' exists between the mobile base station
14 [sic] and the base station.

15 And the sentence that we read earlier
16 from Paragraph -- I've closed my report. I think
17 I found it -- from Paragraph 94, the second part
18 of the sentence that -- first sentence of
19 Paragraph 94 I state, "Nor would it have been
20 obvious for a POSITA to understand, without an
21 explicit disclosure, that this would always be the
22 case because there are situations where it's

1 possible for the opposite relationship to occur
2 regarding the power of both signals. For example,
3 the Ito device could be close to a base station
4 where minimal cellular transmission power is
5 required but still relatively high transmission
6 power level to a mobile device."

7 So I'm actually responding to
8 Dr. Ding's declaration, it appears that this
9 similar passage was included, and I'm agreeing
10 that it can be, but that it doesn't always need to
11 be and it wouldn't be obvious that it would always
12 be the case.

13 Matter of fact, a person of ordinary
14 skill would understand, for situations that I've
15 just included here, that the opposite relationship
16 would occur, and by that I mean where the actual
17 power of the cellular signal is at a lower level
18 than the power level being transmitted to a mobile
19 device.

20 Q Very good. Fair enough. I appreciate
21 the clarification.

22 If you can pull out the copy of the

1 Paneth reference that I believe you should have.

2 MR. RICHARDSON: And if we can please
3 pull a copy of U.S. Patent No. 4,675,863 onto the
4 screen, please.

5 AV TECHNICIAN: This will be Exhibit 9,
6 counsel.

7 (Lanning Exhibit 9 marked for
8 identification and attached to the transcript.)

9 MR. RICHARDSON: Great, thank you.

10 Q And Mr. Lanning, while that's being
11 brought up, old hat at this part -- or at this
12 point -- but if you could just flip through
13 briefly. This is a significantly longer reference
14 so I don't expect you to go through every page,
15 but just to make sure there's nothing obvious that
16 shouldn't be there.

17 A As you said, it's a 65 -- at least
18 65-page patent, I believe.

19 I've scanned through the pages. It
20 appears that it's a clean document. I'll let you
21 know if I see any markings or notations as I look
22 through it further. But right now it looks like a

1 clean document.

2 Q Okay. Great. And I appreciate that.

3 And, again, if you can just confirm
4 that the cover page of the document that you have
5 in physical form in front of you appears to be the
6 same as what's shown on the screen.

7 A Yes.

8 Q Great.

9 MR. RICHARDSON: And we can pull that
10 document down from the screen as well.

11 Q And Mr. Lanning, referring back to your
12 declaration, this time Paragraph 97.

13 A Okay. I'm there.

14 Q Okay. In Paragraph 97, the second
15 sentence reads, "Instead, Paneth discloses an
16 invention that is a Wireless Local Loop (WLL)
17 system. Wireless local loop systems are
18 significantly different than cellular systems even
19 though both may use some similar terminology."

20 Do you see that?

21 A Yes.

22 Q Is it your opinion that Paneth is

1 limited to wireless local loop systems?

2 A What do you mean by "limited to
3 wireless local loop system"?

4 Q Well, I'm asking you because in 97 here
5 you say it "discloses an invention that is a
6 wireless local loop system."

7 And so I'm asking does Paneth disclose
8 anything else besides a wireless local loop
9 system?

10 A Again, I don't know how to answer that
11 question. It's an open-ended question. Does it
12 disclose anything else?

13 I wouldn't be able to answer that
14 question without walking through each page and
15 identifying something that might be disclosed
16 that's not a wireless loop system.

17 But maybe I can answer your question
18 this way and see if this is sufficient: As I've
19 stated in my declaration, the one thing that is
20 clear by my review and analysis of Paneth is it is
21 not a cellular system.

22 Q Okay. And when you say that "it is not

1 a cellular system," do you mean that Paneth's
2 system is incapable of communicating using
3 cellular frequencies?

4 A Over the past few days we've discussed
5 various cellular network standards, specifically,
6 the Gilhousen and Tiedemann references refer to an
7 IS-95 cellular standard, system standard. The
8 Paneth reference is not compatible with the IS-95
9 cellular system standard.

10 Another one of the references, I don't
11 recall off the top of my head, we discussed it
12 yesterday, discusses the GSM standard, and I
13 believe it was Vercauteren, now that I think about
14 it. The Paneth patent does not disclose
15 functionality to be compatible with the other
16 second generation cellular standard that is known
17 as GSM.

18 Q That's fair.

19 So putting aside whether Paneth's
20 system is compliant with every aspect of IS-95
21 standard or GSM, or whatever else you would like
22 to throw in there, do you disagree that Paneth's

1 system can communicate using cellular frequencies?

2 A I'm starting to page through the patent
3 with the realization there's a lot of pages to go
4 through. And maybe to shorten this process, do
5 you have any references or disclosures in Paneth
6 where it's referring to the frequency range or
7 cellular frequency? That's what I'm going to look
8 for, if you don't have that, to answer your
9 question.

10 Q Sure. I can point you to a couple
11 different things.

12 Let's see. So, first, let's take a
13 look at Column 3. And it looks like around
14 Line 37.

15 A Okay.

16 Q I'll go ahead and let you read that
17 portion.

18 But would you agree that Paneth, at
19 least here, discloses the ability to communicate
20 in the 800 to 950 megahertz segments?

21 A That's what it says. I would agree
22 that it says that. I need to really go look

1 before I can answer that question.

2 To answer that question I was just
3 looking at the paragraphs before it to get some
4 context of this level -- or of this area that you
5 pointed me to in Column 3. And it does state that
6 there are two different frequency ranges that the
7 device can work in, the 400 to 500 megahertz and
8 it says that the 800 to 950 megahertz provides
9 good quality speech over a distance of at least
10 20 kilometers.

11 And just, again, to provide some
12 context for what one of ordinary skill in the art
13 would understand is the 800 to 950 megahertz radio
14 segments are the licensed cellular segments. So
15 that's why I believe the 400 to 500 megahertz is
16 listed here. Unlike a cellular network, this is
17 listing a 400 to 500 megahertz frequency bandwidth
18 that would not be used in cellular networks. But
19 as you pointed out, it does list an 800 to 900
20 megahertz segment. In reading this and would
21 understand that this system would be -- need to be
22 licensed by a cellular operator before it could

1 actually use the 800 to 950 megahertz segments.
2 But that would be the same frequency range but it
3 would not communicate with cellular base stations;
4 it would just communicate with its own specific
5 wireless local loop base stations.

6 Q Okay. Fair enough.

7 If you want to turn back to your
8 declaration.

9 A Okay.

10 Q And specifically Paragraph 126.

11 A Okay.

12 Q So in Paragraph 126, the second
13 sentence, it states that "the Rayleigh fading
14 experience by a base station that has its antennas
15 mounted on the tower above most ground-based
16 obstacles like houses, trees, and cars, is
17 significantly different than for a mobile unit in
18 a vehicle that can travel at different speeds and
19 the Rayleigh fading characteristics are constantly
20 changing as the vehicle moves."

21 Do you see that?

22 A Yes.

1 Q And so I'm just hoping to get a little
2 clarification on this.

3 So it's your opinion that in these
4 situations where the antennas are installed above
5 ground on a tower, experience different fading
6 characteristics than when the antennas are
7 installed in a car, for example?

8 A I closed my declaration and I've
9 forgotten which paragraph we're reading from. I
10 think I've read enough of my declaration in Paneth
11 to answer your question but I forgot which
12 paragraph we were referring to.

13 Q 126.

14 A Okay. I'm there. I've reviewed those.
15 If you wouldn't mind just restating the question
16 or reading it back, whatever, so that I make sure
17 I'm answering the correct question.

18 Q Okay. So just trying to kind of clear
19 up the point that you're making here in 126.

20 And so is it your position that the
21 Rayleigh fading experience at a base station
22 installed in a tower is different or significantly

1 different than the Rayleigh fading experience at
2 ground level when you're dealing with a vehicle?

3 Is that what your opinion is here?

4 A Yes, it's significantly different for a
5 fixed device, like a base station. It has its
6 antennas well up above most obstacles versus a
7 vehicle that's traveling not only at different
8 speeds but down different roads or streets where
9 there's many different obstacles that the vehicle
10 is constantly -- that the received signals at the
11 vehicle are constantly changing, which would then
12 be the fading of the signal.

13 Q So I guess I'm just a little confused.

14 So what -- from a technical standpoint
15 from an engineering -- an engineer designing a
16 wireless system, from a technical standpoint, why
17 would it matter that the Rayleigh fading
18 experienced at one end of a communication path may
19 be different from the fading at the other end of a
20 communication path?

21 A Because we're discussing here receiving
22 a signal. So it is the receiver and the situation

1 of the environment that the receiver's in.

2 So the circuitry for a receiver in a
3 moving vehicle that's at ground level that has
4 many different terrestrial obstacles is much
5 different than for a receiver at a fixed base
6 station that has its antennas located above most
7 obstacles.

8 And so what's happening here, as I
9 said, the Rayleigh fading for the vehicle at
10 ground level and it's traveling at different
11 speeds is changing the -- the received signals,
12 and when I say "signals," I'm referring to the
13 multipath versions of the same signal, are
14 changing at a much higher rate than they would be
15 at a receiver for a base station, and they're also
16 changing to the point that at one instant in time
17 one of the versions of the multipath signal may be
18 the strongest and then another signal changes to
19 be the strongest.

20 So not only is the multipath components
21 of each signal changing, the strength of each
22 multipath signal is changing at a much more rapid

1 process.

2 So the circuitry must be much more
3 complex in order to process these changes in the
4 multipath carrier signal as well as changing which
5 signals its using as its reference signal.

6 Q Okay. So I'm going to hopefully parse
7 things out a little bit. I'm going to try and ask
8 some really short, pointed questions, so hopefully
9 we can walk through this pretty slowly.

10 So, first, you would agree that in
11 certain situations there can exist communications
12 between a moving base station in a vehicle and a
13 fixed base station on a tower, correct?

14 A I don't understand your question. This
15 one I did hear but you said something about
16 "situations" and you lost me. Maybe I just lost
17 track of your question.

18 If you want to re-ask it or ask it
19 differently.

20 Q Okay. So -- all right, let's just
21 focus on Ito, okay? You're familiar with the
22 system of Ito, right?

1 A Yes.

2 Q Ito has a moving base station, MSS, in
3 a vehicle, correct?

4 A I wouldn't agree with that statement.
5 It has a -- what it refers to as an MSS. I would
6 agree with that. In other words, I don't agree
7 with the premise of your question.

8 Q Okay.

9 A But I will agree that Ito discloses an
10 MSS that's mounted in the vehicle.

11 Q Okay. You would agree that Ito
12 includes a mobile based device, MSS, in a vehicle,
13 correct?

14 A Yes.

15 Q Okay. And that MSS can communicate
16 with a fixed base station BSS, correct?

17 A Yes.

18 Q And you would agree that that fixed
19 base station, BSS, could be installed on a tower,
20 for example, correct?

21 A And base stations typically do have
22 towers that are of different heights.

1 Q Okay. And let me -- okay. So in the
2 situation where the MSS is communicate -- let me
3 rephrase.

4 In some situations, the MSS can receive
5 signals from the BSS, correct?

6 A Yes.

7 Q And those signals would have to
8 traverse through things like houses and trees,
9 correct?

10 A That's correct.

11 Q And you would also agree that the MSS
12 can transmit signals to a BSS, correct?

13 A Yes.

14 Q And so when the BSS receives those
15 signals from the MSS, those signals would also
16 have to traverse through things like houses and
17 trees, correct?

18 A You'll need to restate. You broke up
19 badly on that one.

20 Q Okay. So when the BSS receives signals
21 from the MSS, you would agree that those signals
22 would also have to traverse through things like

1 houses and trees, correct?

2 A Yes.

3 Q Okay. So if on both ends of this
4 communication path, the BSS and the MSS would both
5 have to deal with received signals that
6 experienced multipath fading from houses and
7 trees, why would the fading at the base station
8 and the fading at the MSS have an impact on the
9 ability to implement certain technology at one
10 point versus the other?

11 A Again, while both the base station and
12 the MSS would experience some type of Rayleigh
13 fading or multipath, as it's often referred to, as
14 I stated earlier, the vehicle, the receiver in the
15 vehicle is having many more changes to that
16 multipath signal -- or let me start.

17 For the vehicle's receiver, many more
18 changes are occurring to the multipath signal at a
19 much more rapid rate than what the base station is
20 experiencing at its end.

21 As I've explained, you have multiple
22 versions of the same signal that take different

1 paths as referred to as "multipath," but a
2 multipath receiver typically chooses two or more
3 of the strongest signals if it has the rake
4 receiver capability. For a base station, that
5 would typically stay the same. For a vehicle,
6 even the strongest signals is rapidly changing
7 between different versions of the signal. As the
8 vehicle moves then the signals are taking
9 different interference, they're taking different
10 linked paths. And so what was the strongest two
11 signals in one instance in time it typically
12 changes to two different signals in another
13 instant in time.

14 Also, the phase of the multipath
15 signals is changing on a much more rapid basis by
16 the vehicles. And this, based on my experience in
17 the 1995 time frame, is why the base stations
18 typically had multiple antennas and did spatial
19 diversity in receiving but the portable and
20 cellular vehicles did not.

21 The circuitry and the level of
22 processing power that was required for the mobiles

1 in the 1995 time frame just wasn't capable of
2 performing this -- these rapid changes in
3 processing of the multipath signals as the vehicle
4 moves.

5 Q Okay. So then if I understand your
6 previous answer correctly, so for all the reasons
7 that you just provided, it's your testimony that
8 the multipath fading experience at the moving base
9 station would be greater than that experience at
10 the fixed base station; is that correct?

11 MR. SMITH: Objection to form.

12 A Again, I don't accept the premise of
13 your question. If we're referring to Ito, I will
14 agree that the Rayleigh fading or the multipath
15 signals experienced by Ito's MSS are significantly
16 different than the Rayleigh fading of a signal
17 received at a conventional base station or the
18 BSS.

19 Q Does "different" mean that the result
20 or the received signal would be impacted more or
21 just in a different fashion?

22 A I've spent 15 minutes explaining that

1 the signals received at the vehicle are much
2 more -- or the processing of the Rayleigh fading
3 signals at the vehicle is much more complex
4 because it changes at a much more rapid rate and
5 the signals that are considered to be the
6 strongest signals in one instant in time change at
7 a rapid rate. So there's two different levels of
8 processing that's much more complex for -- that
9 would be much more complex for the MSS in the Ito
10 vehicle.

11 Q Okay. So then if only characteristics
12 that you previously outlined that are present at
13 the mobile base station in a vehicle, wouldn't it
14 be more important to devise a strategy for
15 combating those issues at the mobile station than
16 it would be to combat those issues at the fixed
17 base station?

18 A Those were important issues that were
19 being worked on by many different companies that
20 spent a lot of money on trying to develop the type
21 of receivers that could be more reliable in CDMA
22 networks in the 1995 time frame.

1 But as I've said, there weren't any of
2 those type of receivers because the technology or
3 the capability to put these -- those functions or
4 this additional complex receiver functionality
5 just wasn't available.

6 MR. SMITH: Ryan, when you get to a
7 good spot, I'm not saying it has to be right now,
8 but when you get to a good spot, I think
9 Mr. Lanning's about ready for a break.

10 MR. RICHARDSON: Yeah, I think we're at
11 a spot. We can take a break. 11:40 or do you
12 need more time?

13 THE WITNESS: 11:40's fine.

14 MR. SMITH: 11:40's good.

15 MR. RICHARDSON: All right. See you
16 then.

17 (Recess taken from 12:29 p.m. to
18 12:42 p.m.)

19 BY MR. RICHARDSON:

20 Q Okay. Let's start with, if you want to
21 pull out the copy of the Gardner reference that
22 you should have.

1 MR. RICHARDSON: And if we can also
2 mark U.S. Patent -- or excuse me -- if we can pull
3 up onto the screen and mark U.S. Patent
4 No. 5,504,786.

5 (Lanning Exhibit 10 marked for
6 identification and attached to the transcript.)

7 Q While that's being brought up,
8 Mr. Lanning, if you want to flip through that
9 again, making sure there's no annotations,
10 highlights, or notes.

11 A It's clean.

12 Q Okay. Great. And the copy you have in
13 front of you appears to correspond to what's on
14 the screen, correct?

15 A Yes.

16 MR. RICHARDSON: Okay. We can pull
17 that document down.

18 Q And if you want to turn to
19 Paragraph 121 of your declaration.

20 A Okay. I'm there.

21 Q Great.

22 If you want to go ahead and read

1 Paragraph 121 to yourself, I'll ask you a couple
2 of questions once you've had a chance to do so.

3 A Okay.

4 Q Okay. So the last sentence of that
5 paragraph, it's a longer one, but it reads, "Based
6 at least on" -- excuse me -- "Based on at least
7 this statement, a POSITA would have understood
8 that combining at least the 'frequency modulate'
9 part of the invention would need to be carefully
10 designed when using it in a FDMA, TDMA, FDMA/TDMA,
11 or CDMA cellular system because all these systems
12 also use different frequencies for their signals
13 for different purposes than those disclosed for
14 Gardner's spatially diverse antennas."

15 Do you see that?

16 A Yes.

17 Q Do you agree that pretty much every
18 wireless lead transmitted signal is transmitted by
19 modulating an RF carrier?

20 A No. I wouldn't characterize at least
21 CDMA's that way.

22 Q Okay. But at least in the other ones

1 that you have listed here, FDMA, TDMA, FDMA/TDMA,
2 is that an accurate statement?

3 A I guess I would say at a very general
4 and high level I would agree with that for the
5 other -- for frequency division and time division.

6 Like I said, I wouldn't characterize
7 CDMA as you've stated.

8 Q Okay. So if we just focus on FDMA and
9 TDMA, would you agree that when using those
10 techniques, a person of ordinary skill in the art
11 would have known how to process the modulated -- a
12 received modulated RF carrier?

13 A That's a different question. Or it's a
14 question that is different than the point I'm
15 making. And while I agree that those systems use
16 a modulated carrier, that is different than a
17 frequency modulated or phase modulated signal that
18 I'm referring to or describing here. Because now
19 you have a frequency carrier that is within --
20 that is specified -- for instance, let me speak
21 specifically for FDMA. FDMA uses different
22 frequencies to establish different channels. So

1 if a channel were to be used between a base
2 station and a mobile station, one frequency would
3 be used, and then for the channel in the reverse
4 direction, a different frequency would be used.

5 And that is at a high level frequency
6 division multiple access. But that's not what
7 we're talking about here.

8 Now we're doing frequency modulation of
9 a signal inside a specific frequency band that has
10 been defined for a channel.

11 Q Okay. And so if I -- so the point that
12 you're making here, then, in Paragraph 121, you're
13 not saying that the frequency modulation technique
14 in Gardner cannot be used with an FDMA or TDMA
15 system, correct?

16 A And I would be careful not to use those
17 words.

18 Q Okay.

19 A And as I said would need to be
20 carefully designed using -- when using it in these
21 different multiple access methods, as I state in
22 Paragraph 121.

1 I guess the last sentence or part of
2 the last sentence is that because these systems
3 use different frequencies for their signals for
4 different purposes than those disclosed for
5 Gardner, especially diverse antennas.

6 Again, just to say something is based
7 on frequencies doesn't make it compatible with a
8 frequency division multiple access cellular
9 network.

10 Q That's fine.

11 So since you have the -- these various
12 multiple access techniques listed here, do you
13 have an opinion if CDMA, TDMA, or FDMA, if one of
14 those would provide better spectral efficiency
15 than the others.

16 A Well, of the ones you -- the list you
17 gave me to choose from, I think it's been proven
18 and well accepted that CDMA cellular networks have
19 better spectral efficiency overall when looking at
20 the overall system of the cellular network.

21 Q Let's take a look at Paragraph 122
22 then, it's the next paragraph.

1 A Okay.

2 Q And in Paragraph 122 it states that,
3 "Gardner does not provide any guidance on how its
4 device can be used for the different types of
5 cellular networks and it would not have been
6 obvious to a POSITA how the 'modulated RF carrier'
7 of Gardner could be combined with the many
8 different frequencies used in FDMA/TDMA system
9 similar to the system disclosed by Ito."

10 Do you see that?

11 A Yes.

12 Q Okay. I think we may have covered this
13 in our previous questions but just to confirm, you
14 would agree that FDMA, TDMA, and CDMA, were
15 well-known wireless multiple access techniques,
16 correct?

17 A They were well known and being used in
18 cellular systems in the 1995 time frame.

19 Q Okay. Is there any reason that you can
20 think of, sitting here today, why the alignment
21 and combining techniques disclosed in Gardner
22 could not be used with these well-known multiple

1 access techniques?

2 A Because for these cellular systems I'm
3 thinking of, these systems did not typically use a
4 frequency -- did not use a frequency modulated
5 part like Gardner teaches. Instead, they use
6 different types of modulation methods for encoding
7 their data.

8 Q Okay. So you would agree, though, and
9 again I think we've covered this, but FDMA, TDMA,
10 and CDMA were commonly used multiple access
11 techniques in cellular communications in the 1995
12 time frame, correct?

13 A Yes.

14 Q Okay. If we can turn to the Gardner
15 patent that you have in front of you.

16 A Okay.

17 Q In Column 1, Line 10 it states that
18 "The present invention relates to the field of
19 mobile digital communications, and more
20 particularly cellular communications."

21 Do you see that?

22 A Yes.

1 Q Okay. And so since Gardner discloses
2 that its system is more particularly directed to
3 cellular communications, why is it your opinion
4 that it cannot be used with either FDMA, TDMA, or
5 CDMA techniques which were also used for cellular
6 communications?

7 A I believe that mischaracterizes the
8 statement that I've used in my declaration, and
9 I'm going back to Paragraph 121 where I said,
10 "Based on at least this statement, a POSITA would
11 have understood that combining at least the
12 'frequency modulated' part of the invention" --
13 meaning the invention of Gardner -- "would need to
14 be carefully designed when using it with FDMA,
15 TDMA, FDMA/TDMA or CDMA cellular system because
16 all of these systems also use different
17 frequencies for their signals for different
18 purposes than those disclosed in Gardner's
19 spatially diverse antennas."

20 Now that's what I said. You said,
21 "Well, Gardner says it can be used in cellular
22 communications systems."

1 I don't disagree with that. However,
2 Gardner does not describe, for example, how his
3 invention would be designed or included with an
4 FDMA system. That's totally left up to a design
5 of someone else or a POSITA. So I'm saying that
6 that is not disclosed in Gardner. And a POSITA
7 would need to provide a lot of careful design in
8 order to put a frequency modulated method of
9 Gardner into a frequency base system where
10 frequencies are used for a different reason.

11 Q Okay. So, again, I think we're just
12 getting back to the point that you're not saying
13 that Gardner's techniques cannot be used with
14 FDMA, TDMA, and CDMA, just that all of the
15 necessary requirements for doing so aren't
16 disclosed in Gardner, correct?

17 A I guess I'm not saying it would be
18 impossible to use Gardner, but I think a person of
19 ordinary skill in the art would read Gardner,
20 think that Gardner was interesting, but then have
21 to look for other references in order to
22 understand how the frequency modulated

1 functionality of Gardner could fit into one of
2 these cellular networks. That's the point I'm
3 making. There's a bunch of complex circuitry
4 that's not disclosed in Gardner and wouldn't be
5 obvious to a person of ordinary skill in the art
6 how to take Gardner and insert it into a device
7 like Ito.

8 Q Understood. But, I mean, I think we
9 would both agree maybe, we'll see, but it would be
10 somewhat illogical for Gardner's invention to not
11 be useful or not be used in FDMA, TDMA, and CDMA
12 given that those are the three most common
13 multiple access techniques in cellular
14 communications which Gardner says it's
15 particularly suited for, right?

16 A I disagree. I think you'll find, if
17 you were to look at the different modulation
18 methods that are used for FDMA, TDMA, or CDMA
19 systems, you'll find that they use different
20 modulation methods to carry the data.

21 The reason is some modulation methods
22 are compatible with the multiple access method

1 used and some are not. So you can't make a
2 general statement like you did to say Gardner's
3 modulation method can just fit or would be well
4 known in FDMA, TDMA, or CDMA type systems.

5 Q Okay. Fair enough.

6 So we were, I think this may have been
7 in the previous paragraph, in Paragraph 121, but
8 we were talking about Gardner's frequency
9 modulation and then we were also discussing
10 modulated RF carriers, correct?

11 A Yes.

12 Q And I think you specifically had us
13 focus down to FDMA and TDMA.

14 But just for clarification, does CDMA
15 use modulated carrier frequencies?

16 A No. CDMA uses one frequency for -- and
17 it's the same frequency for all base stations and
18 all mobile stations.

19 And so if I were to give a frequency
20 bandwidth, every base station would use that same
21 frequency bandwidth. So there's no frequency
22 modulation of a carrier in the CDMA system because

1 they all use the same frequency. As the name or
2 the acronym implies, they all use the same
3 frequency but they modulate their data with what's
4 referred to as a "spreading code," and different
5 spreading codes are used to establish different
6 channels. And so CDMA's quite a different
7 animal -- well, it's a very different animal than
8 FDMA would be.

9 Q Okay. So I think we may have been
10 talking on slightly different things.

11 But, so then in CDMA you would agree,
12 though, that a signal is still modulated onto a
13 particular carrier frequency, right?

14 A Again, I've never thought of it that
15 way nor I think would an ordinary skill in the
16 art.

17 Again, all of the mobiles in all of the
18 base stations all use the same frequency band.
19 And the codes that they use are spread across the
20 whole frequency band.

21 So I wouldn't characterize CDMA as
22 being a modulated carrier or a frequency modulated

1 carrier.

2 Q We may be still talking about slightly
3 different things. I'm not necessarily talking
4 about changing frequencies for CDMA. I'm just
5 talking about whether the signal is modulated onto
6 a particular carrier frequency.

7 A Again, that's what keeps tripping me
8 up. It's a -- your question, if I could -- I'm
9 not trying to be derogatory here, but your
10 question doesn't make sense in regard to CDMA.
11 I've been trying to say that in a nice way.

12 But because the same frequency is used
13 by all of the base stations and the mobiles, they
14 all use the full frequency band. So when any
15 device, whether it's a base station or a mobile,
16 sends a signal, the signal is spread across the
17 whole frequency band, and so there's no modulating
18 of the carrier frequency at all.

19 Q I'm looking back through your previous
20 answer, so give me one second, I want to make sure
21 I use the correct terminology.

22 So I believe in one of your previous

1 answers where you were attempting to clarify the
2 operation of CDMA, you mentioned that -- ah, here
3 it is. I found it. So you said that it "uses the
4 same frequency but they modulate their data."

5 So the modulation of the data is
6 performed in CDMA; is that correct?

7 A The modulation of the data is
8 transmitted -- or the data's transmitted in a CDMA
9 network by taking the data and spreading the data
10 into what's referred to as "chips" with a
11 spreading code that spreads the frequency
12 bandwidth of that data across the full bandwidth
13 of the CDMA system, and all devices that are
14 transmitting in a CDMA system spread their data
15 and spread any other signals they choose to send
16 across the full allocated bandwidth for a CDMA
17 system.

18 Q Okay. I think that's fair enough.

19 MR. RICHARDSON: I think that we will
20 take a quick break and talk about it on our side
21 and figure out if we have any more questions for
22 Mr. Lanning.

1 But we may be coming close to the end
2 here, Elvin.

3 MR. SMITH: All right. Well, sounds
4 good.

5 You want five, ten minutes? What do
6 you need?

7 MR. RICHARDSON: Yeah, why don't we
8 come back -- let's come back at 10 after.

9 MR. SMITH: Okay. Sounds good.

10 (Recess taken from 1:03 p.m. to
11 1:11 p.m.)

12 MR. RICHARDSON: Welcome back,
13 Mr. Lanning. I'm sure you'll be happy but
14 Petitioner does not have any more questions for
15 Mr. Lanning at this time.

16 MR. SMITH: We do not have any
17 questions either.

18 THE WITNESS: And so I guess we'll just
19 end this with being disappointed if we don't have
20 any more questions.

21 MR. RICHARDSON: I can see the
22 disappointment on your face.

1 THE WITNESS: Yeah, yeah. For a
2 Friday. Yeah. All right. Thanks.

3 MR. RICHARDSON: Before we sign off,
4 Elvin, just, again, housekeeping-for-the-record
5 issue.

6 Yesterday and today's deposition
7 transcripts were the '904 and the '543 patents, I
8 believe our earlier agreement still covers these
9 two that we can use these equally across the court
10 proceedings relating just to Volkswagen as needed?

11 MR. SMITH: That is correct.

12 MR. RICHARDSON: Okay. And Mr. Lanning
13 is not in the room anymore, but if --

14 THE WITNESS: Yes, I am. I turned my
15 computer so you can't talk about me.

16 MR. SMITH: I actually don't have
17 audio. We have been using his audio the whole
18 time off his to try to lessen interference.

19 MR. RICHARDSON: Great. And
20 Mr. Lanning, before I let you go, again, just
21 housekeeping issues. Just to confirm, at no point
22 during your deposition -- or excuse me -- during

1 the breaks of day three and day four did you talk
2 to your counsel about any substantive issues for
3 your questioning?

4 THE WITNESS: I want to make sure of
5 the question. I did not speak with counsel in any
6 of the four days during breaks or any other time
7 regarding my testimony.

8 MR. RICHARDSON: Okay. Great.

9 Then with that, Petitioner has nothing
10 else. I think the court reporter may have one
11 more item.

12 COURT REPORTER: Mr. Smith?

13 MR. SMITH: We do want a copy of the
14 transcript, by the way.

15 COURT REPORTER: Okay. That was going
16 to be my question.

17 MR. SMITH: And I don't know if we got
18 it on the record from the prior one or not, but we
19 want one from all four of the depositions and just
20 regular. We don't need them expedited.

21 MR. RICHARDSON: Well, with that, I
22 think we're all good.

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(Off the record at 1:20 p.m. EST)

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ACKNOWLEDGMENT OF DEPONENT

I, MARK R. LANNING, do hereby
acknowledge that I have read and examined the
foregoing testimony, and the same is a true,
correct and complete transcription of the
testimony given by me and any corrections appear
on the attached Errata sheet signed by me.

(DATE)

(SIGNATURE)

1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2
3 I, Judith E. Bellinger, Certified
4 Reporter and
5 Notary Public within and for the State of Maryland
6 do hereby certify:

7 That MARK R. LANNING, the witness whose
8 deposition is hereinbefore set forth, was duly
9 sworn by me before the commencement of such
10 deposition and that such deposition was taken
11 before me and is a true record of the testimony
12 given by such
13 witness.

14 I further certify that the adverse
15 party, CARUCEL INVESTMENTS, L.P., was represented
16 by counsel at the deposition.

17 I further certify that the deposition of
18 MARK R. LANNING occurred with the witness being
19 present at the office of Warren | Rhoades LLP,
20 1212 Corporate Drive, Suite 250, Irving, Texas
21 75038, on Friday, June 5, 2020, commencing at
22 11:10 a.m. EST to 1:20 p.m. EST.

1 IN WITNESS WHEREOF, I have hereunto set
2 my hand this 16th day of June, 2020.

3 My Commission Expires: November 3, 2020

4 *Judith E. Bellinger*
5 _____

6 NOTARY PUBLIC IN AND FOR

7 THE STATE OF MARYLAND

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A			
ability	adverse	280:19, 280:22	antennas
250:19, 259:9	283:14	allocated	252:14, 253:4,
able	after	277:16	253:6, 254:6,
241:13, 248:13	229:22, 278:8	also	255:6, 260:18,
about	again	223:3, 235:5,	265:14, 268:5,
225:21, 229:17,	235:10, 238:9,	255:15, 258:11,	271:19
237:2, 237:13,	247:3, 248:10,	258:15, 258:22,	any
237:17, 237:18,	251:11, 259:11,	260:14, 264:1,	235:11, 246:21,
241:9, 249:13,	261:12, 264:9,	265:12, 271:5,	250:5, 263:1,
256:15, 263:9,	268:6, 270:9,	271:16, 274:9	269:3, 269:19,
267:7, 274:8,	272:11, 275:14,	always	276:14, 277:15,
276:2, 276:4,	275:17, 276:7,	231:15, 231:20,	277:21, 278:14,
276:5, 277:20,	279:4, 279:20	232:2, 236:18,	278:16, 278:20,
279:15, 280:2	against	238:7, 238:8,	280:2, 280:5,
above	238:5	244:21, 245:10,	280:6, 282:6
252:15, 253:4,	agree	245:11	anymore
254:6, 255:6	250:18, 250:21,	america	279:13
accept	256:10, 257:4,	220:5	anything
243:1, 261:12	257:6, 257:9,	amplified	248:8, 248:12
accepted	257:11, 257:18,	243:14	apparatus
268:18	258:11, 258:21,	amplifier	239:20
access	261:14, 265:17,	243:14, 243:18,	appeal
267:6, 267:21,	266:4, 266:9,	244:10	220:3
268:8, 268:12,	266:15, 269:14,	analysis	appear
269:15, 270:1,	270:8, 273:9,	240:22, 248:20	282:6
270:10, 273:13,	275:11	animal	appears
273:22	agreeing	275:7	234:12, 235:16,
accurate	245:9	annotations	241:18, 245:8,
226:11, 266:2	agreement	233:9, 235:11,	246:20, 247:5,
acknowledge	279:8	264:9	264:13
282:3	ah	another	appreciate
acknowledgment	277:2	228:2, 229:5,	245:20, 247:2
282:1	ahead	230:5, 249:10,	area
acronym	250:16, 264:22	255:18, 260:12	227:16, 227:17,
275:2	alignment	answer	228:1, 251:4
across	269:20	229:21, 240:12,	aren't
275:19, 276:16,	all	241:13, 242:19,	272:15
277:12, 277:16,	225:6, 225:12,	248:10, 248:13,	argument
279:9	228:22, 229:12,	248:17, 250:8,	238:5
actual	256:20, 261:6,	251:1, 251:2,	around
245:16	263:15, 265:11,	253:11, 261:6,	250:13
actually	271:16, 272:14,	276:20	art
233:12, 245:7,	274:17, 274:18,	answering	251:12, 266:10,
252:1, 279:16	275:1, 275:2,	253:17	272:19, 273:5,
additional	275:17, 275:18,	answers	275:16
263:4	276:13, 276:14,	227:7, 277:1	aside
	276:18, 277:13,	antenna	232:17, 249:19
	278:3, 279:2,	243:17	ask
			229:18, 235:2,

240:18, 241:8, 256:7, 256:18, 265:1 asked 229:13 asking 229:17, 237:12, 241:11, 248:4, 248:7 aspect 249:20 associated 241:16 attached 224:5, 233:3, 236:4, 246:8, 264:6, 282:7 attempting 277:1 attention 236:6 audio 279:17 av 223:4, 234:21, 246:5 available 263:5 avenue 222:6	277:16 base 226:5, 226:8, 226:11, 226:12, 227:1, 227:2, 227:5, 227:6, 227:10, 227:11, 227:15, 227:16, 227:17, 227:19, 227:21, 228:3, 229:4, 229:15, 230:7, 230:12, 231:6, 231:9, 231:16, 231:19, 231:21, 232:2, 232:8, 232:13, 236:11, 238:20, 239:21, 240:2, 240:3, 240:4, 240:7, 240:14, 242:7, 242:11, 243:15, 243:21, 244:13, 244:14, 245:3, 252:3, 252:5, 252:14, 253:21, 254:5, 255:5, 255:15, 256:12, 256:13, 257:2, 257:16, 257:19, 257:21, 259:7, 259:11, 259:19, 260:4, 260:17, 261:8, 261:10, 261:17, 262:13, 262:17, 267:1, 272:9, 274:17, 274:20, 275:18, 276:13, 276:15 based 257:12, 260:16, 265:5, 265:6, 268:6, 271:10 basis 260:15 because 231:20, 236:19, 238:15, 243:19,	244:11, 244:22, 248:4, 254:21, 262:4, 263:2, 265:11, 266:18, 268:2, 270:2, 271:15, 274:22, 276:12 become 227:18 been 225:3, 228:2, 234:19, 236:16, 244:19, 267:10, 268:17, 269:5, 274:6, 275:9, 276:11, 279:17 before 220:3, 221:11, 227:22, 228:6, 251:1, 251:3, 251:22, 279:3, 279:20, 283:9, 283:11 beginning 239:11, 243:7 begins 236:10 behalf 222:2, 222:10 being 228:20, 233:5, 233:17, 235:9, 235:21, 240:14, 244:4, 245:18, 246:10, 262:19, 264:7, 269:17, 275:22, 278:19, 283:18 believe 225:13, 237:11, 237:13, 239:18, 241:17, 246:1, 246:18, 249:13, 251:15, 271:7, 276:22, 279:8 bellinger 220:22, 221:12, 283:3	belongs 242:11 besides 248:8 best 225:9 better 268:14, 268:19 between 226:22, 227:6, 227:11, 232:13, 243:20, 244:13, 256:12, 260:7, 267:1 bills 228:22 bit 234:8, 243:6, 256:7 block 242:6 board 220:3 both 226:7, 236:21, 237:19, 237:20, 245:2, 247:19, 259:3, 259:4, 259:11, 273:9 bottom 241:21, 243:1 box 241:18, 241:19, 241:20, 242:22, 243:1 break 263:9, 263:11, 277:20 breaks 280:1, 280:6 bridgette 223:4 briefly 230:19, 233:6, 235:11, 246:13 bring 235:6 broke 258:18
B			
back 225:7, 225:12, 243:6, 247:11, 252:7, 253:16, 271:9, 272:12, 276:19, 278:8, 278:12 badly 258:19 band 267:9, 275:18, 275:20, 276:14, 276:17 bandwidth 251:17, 274:20, 274:21, 277:12,			

brought 233:5, 233:17, 235:10, 246:11, 264:7 bss 242:11, 244:4, 257:16, 257:19, 258:5, 258:12, 258:14, 258:20, 259:4, 261:18 bunch 273:3	capability 260:4, 263:3 capable 231:5, 231:10, 232:4, 261:1 car 253:7 careful 267:16, 272:7 carefully 265:9, 267:20, 271:14 carrier 256:4, 265:19, 266:12, 266:16, 266:19, 269:6, 274:15, 274:22, 275:13, 275:22, 276:1, 276:6, 276:18 carriers 274:10 carry 273:20 cars 252:16 carucel 220:8, 283:15 case 220:11, 220:14, 229:3, 236:18, 238:8, 244:22, 245:12 cdma 262:21, 265:11, 266:7, 268:13, 268:18, 269:14, 270:10, 271:5, 271:15, 272:14, 273:11, 273:18, 274:4, 274:14, 274:16, 274:22, 275:11, 275:21, 276:4, 276:10, 277:2, 277:6, 277:8, 277:13, 277:14, 277:16 cdma's 275:6	cdmas 265:21 cell 228:1, 228:4, 228:16, 229:3, 229:5, 229:14, 229:22, 230:3, 230:5, 230:6, 230:12, 230:13, 232:1 cell's 228:1 cellular 226:22, 227:4, 228:10, 228:18, 229:1, 229:5, 229:8, 229:9, 230:2, 230:3, 231:5, 231:7, 231:9, 231:11, 231:14, 231:16, 231:18, 231:20, 231:21, 232:3, 232:5, 232:9, 232:12, 236:13, 238:21, 239:15, 240:8, 245:4, 245:17, 247:18, 248:21, 249:1, 249:3, 249:5, 249:7, 249:9, 249:16, 250:1, 250:7, 251:14, 251:16, 251:18, 251:22, 252:3, 260:20, 265:11, 268:8, 268:18, 268:20, 269:5, 269:18, 270:2, 270:11, 270:20, 271:3, 271:5, 271:15, 271:21, 273:2, 273:13 certain 256:11, 259:9 certificate 283:1 certified 221:13, 283:3	certify 283:6, 283:14, 283:17 challenged 225:18, 231:4, 231:17, 238:2, 239:18, 239:19 chance 265:2 change 262:6 changes 255:18, 256:3, 259:15, 259:18, 260:12, 261:2, 262:4 changing 252:20, 254:11, 255:11, 255:14, 255:16, 255:21, 255:22, 256:4, 260:6, 260:15, 276:4 channel 242:12, 242:15, 267:1, 267:3, 267:10 channels 243:11, 266:22, 275:6 characteristics 252:19, 253:6, 262:11 characterize 265:20, 266:6, 275:21 charles 223:5 chips 277:10 choose 268:17, 277:15 chooses 260:2 circuitry 255:2, 256:2, 260:21, 273:3 claim 237:22, 238:18
C			
call 229:11 called 225:17 can 225:11, 225:17, 225:20, 227:12, 228:15, 229:9, 229:15, 232:12, 232:16, 232:19, 234:11, 234:18, 235:1, 235:5, 235:10, 235:20, 236:1, 237:5, 241:8, 242:2, 243:3, 245:10, 245:22, 246:2, 247:3, 247:9, 248:17, 250:1, 250:10, 251:1, 251:7, 252:18, 256:9, 256:11, 257:15, 258:4, 258:12, 263:11, 264:1, 264:2, 264:16, 269:4, 269:19, 270:14, 271:21, 274:3, 278:21, 279:9 can't 274:1, 279:15 cannot 267:14, 271:4, 272:13			

claims 231:5, 231:17, 236:15, 238:1, 238:3, 239:2, 239:18, 239:19, 240:11, 240:17 clarification 228:7, 228:8, 228:14, 234:18, 238:14, 245:21, 253:2, 274:14 clarify 241:3, 277:1 clean 233:10, 235:13, 246:20, 247:1, 264:11 clear 237:2, 237:15, 242:1, 248:20, 253:18 clearly 241:1 close 245:3, 278:1 closed 244:16, 253:8 code 275:4, 277:11 codes 275:5, 275:19 column 242:2, 243:4, 244:7, 250:13, 251:5, 270:17 combat 262:16 combating 262:15 combined 269:7 combining 265:8, 269:21, 271:11 come 278:8 coming 243:18, 244:9,	278:1 commencement 283:9 commencing 283:21 commission 284:3 common 273:12 commonly 239:20, 270:10 communicate 231:15, 231:19, 250:1, 250:19, 252:3, 252:4, 257:15, 258:2 communicating 231:6, 231:7, 231:8, 232:1, 232:8, 249:2 communication 232:13, 242:11, 242:14, 254:18, 254:20, 259:4 communications 232:15, 256:11, 270:11, 270:19, 270:20, 271:3, 271:6, 271:22, 273:14 companies 262:19 compatible 249:8, 249:15, 268:7, 273:22 complete 282:5 complex 256:3, 262:3, 262:8, 262:9, 263:4, 273:3 compliant 249:20 components 255:20 comprises 242:7 computer 279:15	conducted 221:1 configured 239:9, 239:14 confirm 234:11, 234:19, 235:10, 247:3, 269:13, 279:21 confirming 233:19 confused 254:13 connected 227:4 connecting 226:10 connection 227:1 considered 262:5 constantly 252:19, 254:10, 254:11 consulting 226:16 contains 234:2 context 251:4, 251:12 conventional 261:17 copy 235:3, 235:14, 245:22, 246:3, 263:21, 264:12, 280:13 corporate 222:19, 283:20 correct 225:17, 225:19, 225:20, 232:10, 232:11, 234:3, 234:4, 234:21, 235:17, 237:6, 242:20, 253:17, 256:13, 257:3, 257:13, 257:16, 257:20, 258:5,	258:9, 258:10, 258:12, 258:17, 259:1, 261:10, 264:14, 267:15, 269:16, 270:12, 272:16, 274:10, 276:21, 277:6, 279:11, 282:5 corrections 282:6 correctly 261:6 correspond 235:16, 264:13 could 230:18, 232:14, 233:14, 234:7, 234:9, 238:12, 245:3, 246:12, 251:22, 257:19, 262:21, 269:7, 269:22, 273:1, 276:8 counsel 225:4, 234:21, 246:6, 280:2, 280:5, 283:16 couple 225:14, 250:10, 265:1 court 279:9, 280:10, 280:12, 280:15 cover 234:13, 247:4 coverage 227:16, 227:17, 228:1 covered 241:12, 269:12, 270:9 covers 279:8 crr 220:22 customer 228:20 <hr/> D <hr/> dartbrook 222:13
---	--	---	--

data 270:7, 273:20, 275:3, 277:4, 277:5, 277:7, 277:9, 277:12, 277:14 data's 277:8 date 233:20, 282:10 day 225:7, 225:10, 280:1, 284:2 days 225:14, 249:4, 280:6 deal 259:5 dealing 227:14, 254:2 declaration 224:8, 226:17, 230:17, 232:17, 232:18, 232:20, 233:15, 233:19, 234:2, 234:19, 236:6, 241:12, 245:8, 247:12, 248:19, 252:8, 253:8, 253:10, 264:19, 271:8 declarations 234:1 defined 240:2, 267:10 definitely 230:9 depending 226:8 deponent 282:1 deposition 220:17, 221:1, 224:7, 235:21, 239:22, 279:6, 279:22, 283:8, 283:10, 283:16, 283:17	depositions 225:14, 280:19 derogatory 276:9 describe 272:2 described 230:2, 230:10 describing 242:18, 266:18 design 272:4, 272:7 designed 265:10, 267:20, 271:14, 272:3 designing 254:15 details 241:10 develop 262:20 device 228:19, 236:12, 236:14, 238:20, 239:1, 239:17, 240:2, 240:7, 240:9, 242:7, 242:14, 243:21, 245:3, 245:6, 245:19, 251:7, 254:5, 257:12, 269:4, 273:6, 276:15 devices 277:13 devise 262:14 diagram 242:7 did 256:15, 260:18, 260:20, 270:3, 270:4, 274:2, 280:1, 280:5 different 226:1, 226:20, 232:15, 240:21, 241:11, 241:19, 247:18, 250:11, 251:6, 252:17, 252:18, 253:5, 253:22, 254:1, 254:4, 254:7, 254:8, 254:9, 254:19, 255:4, 255:5, 255:10, 257:22, 259:22, 260:7, 260:9, 260:12, 261:16, 261:19, 261:21, 262:7, 262:19, 265:12, 265:13, 266:13, 266:14, 266:16, 266:21, 266:22, 267:4, 267:21, 268:3, 268:4, 269:4, 269:8, 270:6, 271:16, 271:17, 272:10, 273:17, 273:19, 275:4, 275:5, 275:6, 275:7, 275:10, 276:3 differently 229:19, 256:19 digital 270:19 ding 240:13 ding's 239:22, 245:8 direct 227:1, 236:5 directed 271:2 direction 267:4 directly 231:6 disagree 240:19, 241:5, 249:22, 272:1, 273:16 disappointed 278:19	disappointment 278:22 disclose 236:11, 237:4, 237:21, 238:17, 238:19, 239:13, 240:6, 248:7, 248:12, 249:14 disclosed 225:16, 248:15, 265:13, 268:4, 269:9, 269:21, 271:18, 272:6, 272:16, 273:4 discloses 237:11, 240:19, 247:15, 248:5, 250:19, 257:9, 271:1 disclosure 236:18, 238:7, 244:21 disclosures 250:5 discussed 228:9, 234:2, 243:11, 249:4, 249:11 discusses 249:12 discussing 242:19, 243:9, 254:21, 274:9 discussion 233:1 displayed 235:21 distance 243:20, 244:12, 251:9 dive 225:12 diverse 265:14, 268:5, 271:19 diversity 260:19 division 266:5, 267:6,
---	---	--

268:8 document 226:15, 233:10, 233:13, 234:13, 235:13, 235:16, 236:1, 246:20, 247:1, 247:4, 247:10, 264:17 document's 233:4 does 227:18, 229:14, 230:6, 230:9, 236:10, 237:4, 237:21, 238:16, 238:19, 239:13, 240:6, 241:1, 248:7, 248:11, 249:14, 251:5, 251:19, 261:19, 269:3, 272:2, 274:14, 278:14 doesn't 241:18, 245:10, 268:7, 276:10 doing 267:8, 272:15 don't 226:14, 233:6, 233:18, 237:11, 240:21, 246:14, 248:10, 249:10, 250:8, 256:14, 257:6, 261:12, 272:1, 278:7, 278:19, 279:16, 280:17, 280:20 down 235:1, 236:1, 247:10, 254:8, 264:17, 274:13 dr 234:8, 239:22, 240:13, 245:8 drive 222:19, 283:20 duly 225:3, 283:8	during 225:14, 279:22, 280:6 <hr/> E <hr/> each 248:14, 255:21 earlier 244:15, 259:14, 279:8 efficiency 268:14, 268:19 either 271:4, 278:17 elements 226:4 else 248:8, 248:12, 249:21, 272:5, 280:10 elvin 222:11, 222:12, 278:2, 279:4 encoding 270:6 end 254:18, 254:19, 259:20, 278:1, 278:19 ending 232:21 ends 259:3 engineer 254:15 engineering 254:15 enough 243:2, 245:20, 252:6, 253:10, 274:5, 277:18 enters 228:2 entire 234:9 environment 255:1 equally 279:9	errata 282:7 especially 268:5 esquire 222:3, 222:11, 222:17 est 281:1, 283:22 establish 266:22, 275:5 even 238:11, 240:22, 241:17, 247:18, 260:6 event 229:10 every 246:14, 249:20, 265:17, 274:20 exactly 227:8 examination 224:2, 225:4 examined 282:3 example 245:2, 253:7, 257:20, 272:2 excuse 230:3, 231:8, 243:16, 264:2, 265:6, 279:22 exhibit 224:8, 224:9, 224:10, 224:11, 233:2, 234:20, 235:22, 236:3, 246:5, 246:7, 264:5 exhibits 224:7 exist 256:11 existence 237:18 exists 243:20, 244:13	expect 246:14 expedited 280:20 experience 252:14, 253:5, 253:21, 254:1, 259:12, 260:16, 261:8, 261:9 experienced 254:18, 259:6, 261:15 experiencing 259:20 expert 232:20 expires 284:3 explain 228:14 explained 259:21 explaining 261:22 explanation 229:13, 229:20 explicit 236:17, 238:7, 244:21 <hr/> F <hr/> face 278:22 fact 245:13 fading 252:13, 252:19, 253:5, 253:21, 254:1, 254:12, 254:17, 254:19, 255:9, 259:6, 259:7, 259:8, 259:13, 261:8, 261:14, 261:16, 262:2 fair 232:12, 243:2, 245:20, 249:18,
---	---	--	--

252:6, 274:5, 277:18 familiar 256:21 far 225:10, 228:21 fashion 261:21 fdma 265:10, 266:1, 266:8, 266:21, 267:14, 268:13, 269:8, 269:14, 270:9, 271:4, 271:14, 271:15, 272:4, 272:14, 273:11, 273:18, 274:4, 274:13, 275:8 few 249:4 field 270:18 figure 241:15, 241:17, 241:21, 242:5, 242:6, 242:22, 277:21 find 273:16, 273:19 fine 243:8, 263:13, 268:10 first 226:21, 227:16, 227:21, 234:9, 235:15, 237:9, 237:20, 238:9, 238:18, 240:5, 242:8, 242:9, 242:12, 243:10, 244:18, 250:12, 256:10 fit 273:1, 274:3 five 278:5 fixed 226:5, 227:1,	227:6, 227:11, 227:16, 227:17, 231:6, 231:19, 254:5, 255:5, 256:13, 257:16, 257:18, 261:10, 262:16 flip 243:3, 246:12, 264:8 focus 225:20, 227:12, 256:21, 266:8, 274:13 focusing 231:2 folder 235:7 follows 225:3 foregoing 282:4 forgot 253:11 forgotten 253:9 form 247:5, 261:11 forth 283:8 forward 243:3 found 244:17, 277:3 four 225:7, 280:1, 280:6, 280:19 fox 222:4 frame 228:11, 229:2, 260:17, 261:1, 262:22, 269:18, 270:12 frequencies 249:3, 250:1, 265:12, 266:22, 268:3, 268:7,	269:8, 271:17, 272:10, 274:15, 276:4 frequency 243:16, 250:6, 250:7, 251:6, 251:17, 252:2, 265:8, 266:5, 266:17, 266:19, 267:2, 267:4, 267:5, 267:8, 267:9, 267:13, 268:8, 270:4, 271:12, 272:8, 272:9, 272:22, 274:8, 274:16, 274:17, 274:19, 274:21, 275:1, 275:3, 275:13, 275:18, 275:20, 275:22, 276:6, 276:12, 276:14, 276:17, 276:18, 277:4, 277:11 friday 220:18, 279:2, 283:21 fringe 228:4, 230:4 from 229:5, 230:13, 235:1, 243:7, 243:18, 244:4, 244:6, 244:7, 244:9, 244:16, 244:17, 247:10, 253:9, 254:14, 254:15, 254:16, 254:19, 258:5, 258:15, 258:21, 259:6, 263:17, 268:17, 278:10, 280:18, 280:19 front 230:17, 234:13, 235:15, 242:1, 247:5, 264:13, 270:15	full 276:14, 277:12, 277:16 function 230:14, 232:10, 239:9 functionality 249:15, 263:4, 273:1 functions 263:3 further 246:22, 283:14, 283:17 <hr/> G <hr/> gardner 263:21, 267:14, 268:5, 269:3, 269:7, 269:21, 270:5, 270:14, 271:1, 271:13, 271:21, 272:2, 272:6, 272:9, 272:16, 272:18, 272:19, 272:20, 273:1, 273:4, 273:6, 273:14 gardner's 265:14, 271:18, 272:13, 273:10, 274:2, 274:8 gave 268:17 gavrilovich 223:5 general 240:20, 241:6, 266:3, 274:2 generation 249:16 get 238:14, 251:3, 253:1, 263:6, 263:8 gets 228:4 getting 272:12
--	--	---	--

<p>gilhousen 249:6 give 274:19, 276:20 given 273:12, 282:6, 283:12 go 234:10, 243:6, 246:14, 250:3, 250:16, 250:22, 264:22, 279:20 going 236:5, 250:7, 256:6, 256:7, 271:9, 280:15 goldstein 222:4 good 225:6, 228:21, 245:20, 251:9, 263:7, 263:8, 263:14, 278:4, 278:9, 280:22 got 280:17 great 226:19, 233:11, 233:22, 234:16, 235:14, 235:19, 246:9, 247:2, 247:8, 264:12, 264:21, 279:19, 280:8 greater 261:9 ground 253:5, 254:2, 255:3, 255:10 ground-based 252:15 group 220:5 gsm 249:12, 249:17, 249:21 guess 254:13, 266:3,</p>	<p>268:1, 272:17, 278:18 guidance 269:3</p> <hr/> <p>H</p> <hr/> <p>had 225:10, 225:15, 226:9, 260:18, 265:2, 274:12 hand 284:2 handoff 225:17, 226:4, 226:21, 227:3, 227:6, 227:9, 227:11, 227:12, 227:22, 228:6 handoffs 226:2, 226:20, 226:22 handover 226:13 happening 255:8 happy 278:13 has 237:7, 237:9, 239:22, 240:13, 240:16, 244:4, 252:14, 254:5, 255:3, 255:6, 257:2, 257:5, 260:3, 263:7, 267:9, 280:9 hat 246:11 have 225:10, 225:15, 228:13, 229:20, 230:16, 232:7, 233:13, 234:13, 235:3, 235:15, 236:16, 237:5, 241:1, 241:18, 241:19, 241:22, 244:19, 246:1,</p>	<p>247:4, 250:5, 250:8, 257:21, 258:7, 258:16, 258:22, 259:5, 259:8, 259:21, 263:22, 264:12, 265:7, 266:1, 266:11, 266:19, 268:11, 268:13, 268:18, 269:5, 269:12, 270:15, 271:11, 272:20, 274:6, 275:9, 277:21, 278:14, 278:16, 278:19, 279:16, 279:17, 280:10, 282:3, 284:1 having 225:3, 259:15 head 249:11 heading 239:13 hear 256:15 heights 257:22 held 233:1 help 241:7 here 225:16, 232:7, 234:19, 237:20, 239:3, 243:9, 244:12, 245:15, 248:4, 250:19, 251:16, 253:19, 254:3, 254:21, 255:8, 266:1, 266:18, 267:7, 267:12, 268:12, 269:20, 276:9, 277:2, 278:2 hereby 282:2, 283:6 hereinbefore 283:8</p>	<p>hereunto 284:1 high 243:15, 243:19, 244:11, 245:5, 266:4, 267:5 higher 236:14, 237:5, 238:22, 239:6, 239:16, 240:9, 244:5, 255:14 highlights 233:8, 264:10 his 272:2, 279:17, 279:18 hopefully 256:6, 256:8 hoping 253:1 housekeeping 279:21 housekeeping-for- -the-record 279:4 houses 252:16, 258:8, 258:16, 259:1, 259:6 how 227:18, 229:13, 229:14, 248:10, 266:11, 269:3, 269:6, 272:2, 272:22, 273:6 however 272:1 hypothetical 237:12</p> <hr/> <p>I</p> <hr/> <p>i'll 228:6, 228:13, 229:19, 235:2, 240:11, 246:20, 250:16, 265:1 i've 228:3, 240:15,</p>
--	---	---	---

240:22, 244:16, 245:14, 246:19, 248:18, 253:8, 253:10, 253:14, 259:21, 261:22, 263:1, 271:8, 275:14, 276:11 i-t-o 235:6 idea 228:5 identification 233:3, 236:4, 246:8, 264:6 identified 240:13 identifying 226:15, 248:15 illogical 273:10 impact 259:8 impacted 261:20 implement 259:9 implies 237:7, 237:9, 275:2 important 262:14, 262:18 impossible 272:18 inc 220:5 incapable 249:2 included 245:9, 245:15, 272:3 includes 241:5, 257:12 initial 230:1, 244:8 initially 228:16, 230:1, 244:11 insert 273:6	inside 267:9 installed 253:4, 253:7, 253:22, 257:19 instance 260:11, 266:20 instant 255:16, 260:13, 262:6 instead 247:15, 270:5 interesting 272:20 interference 260:9, 279:18 into 227:17, 230:5, 272:9, 273:1, 273:6, 277:10 invention 236:12, 238:21, 240:7, 247:16, 248:5, 265:9, 270:18, 271:12, 271:13, 272:3, 273:10 inventions 225:16 investments 220:8, 283:15 ipr 220:11, 220:14 irving 222:21, 283:20 issue 225:16, 279:5 issues 262:15, 262:16, 262:18, 279:21, 280:2 it's 226:7, 228:5, 228:17, 228:19, 229:7, 229:10, 231:18, 233:10, 234:19, 235:13, 237:17, 242:4,	244:10, 244:22, 246:17, 246:20, 248:11, 250:6, 253:3, 254:4, 255:10, 259:13, 261:7, 264:11, 265:5, 266:13, 268:17, 268:22, 273:14, 274:17, 275:7, 276:8, 276:15 item 280:11 ito 235:4, 235:6, 235:12, 235:21, 236:10, 237:4, 237:7, 237:9, 237:11, 237:14, 237:21, 238:16, 238:19, 239:13, 240:1, 240:2, 240:5, 240:13, 240:19, 241:13, 241:15, 241:22, 242:4, 244:3, 245:3, 256:21, 256:22, 257:2, 257:9, 257:11, 261:13, 262:9, 269:9, 273:7 ito's 241:5, 261:15 its 236:11, 236:12, 238:21, 240:6, 240:7, 242:14, 252:4, 252:14, 254:5, 255:6, 256:5, 259:20, 269:3, 271:2 <hr/> J <hr/> job 220:20 judith 220:22, 221:11, 283:3	june 220:18, 283:21, 284:2 just 225:20, 226:14, 227:10, 228:6, 229:4, 229:7, 230:2, 230:10, 232:7, 233:7, 233:14, 234:17, 235:10, 237:2, 237:15, 238:14, 239:7, 241:9, 242:1, 242:5, 245:15, 246:12, 246:15, 247:3, 251:2, 251:11, 252:4, 253:1, 253:15, 253:18, 254:13, 256:16, 256:20, 261:1, 261:7, 261:21, 263:5, 266:8, 268:6, 269:13, 272:11, 272:14, 274:3, 274:14, 276:4, 278:18, 279:4, 279:10, 279:20, 279:21, 280:19 <hr/> K <hr/> keeps 276:7 kessler 222:4 key 244:12 kilometers 251:10 kind 233:7, 243:8, 253:18 know 240:22, 246:21, 248:10, 280:17 known 249:16, 266:11,
--	--	---	---

269:17, 274:4	lessen	listed	248:16, 252:5
L	279:18	232:7, 251:16,	losing
labeled	let	266:1, 268:12	228:5
234:20, 239:12,	228:14, 229:18,	listing	lost
241:20, 241:21,	240:18, 241:3,	251:17	228:6, 256:16
242:22	246:20, 250:16,	little	lot
language	258:1, 258:2,	234:8, 243:6,	250:3, 262:20,
231:3, 238:2	259:16, 266:20,	253:1, 254:13,	272:7
lanning	279:20	256:7	lower
220:17, 221:1,	let's	llp	239:7, 245:17
224:2, 224:7,	225:12, 250:12,	222:18, 283:19	M
225:2, 225:6,	256:20, 263:20,	local	make
225:13, 226:14,	268:21, 278:8	247:16, 247:17,	225:9, 228:7,
233:2, 233:4,	level	248:1, 248:3,	246:15, 253:16,
233:18, 234:9,	236:13, 236:15,	248:6, 248:8,	268:7, 274:1,
235:2, 235:9,	237:5, 238:22,	252:5	276:10, 276:20,
236:3, 236:5,	239:1, 239:16,	locate	280:4
241:7, 246:7,	239:17, 240:9,	229:10	making
246:10, 247:11,	243:13, 243:17,	located	233:7, 237:3,
264:5, 264:8,	244:3, 244:5,	255:6	237:16, 237:19,
277:22, 278:13,	244:9, 244:10,	location	237:20, 238:4,
278:15, 279:12,	245:6, 245:17,	228:11, 229:6,	239:3, 253:19,
279:20, 282:2,	245:18, 251:4,	229:7, 230:15	264:9, 266:15,
283:7, 283:18	254:2, 255:3,	logical	267:12, 273:3
lanning's	255:10, 260:21,	244:2	many
232:20, 233:15,	266:4, 267:5	long	254:9, 255:4,
263:9	levels	229:12, 243:19,	259:15, 259:17,
last	237:17, 262:7	244:12	262:19, 269:7
225:14, 233:18,	licensed	longer	mark
265:4, 268:1,	251:14, 251:22	246:13, 265:5	220:17, 221:1,
268:2	like	look	224:2, 225:2,
law	225:21, 233:13,	246:21, 250:7,	235:20, 264:2,
222:12	239:18, 246:22,	250:13, 250:22,	264:3, 282:2,
lead	249:21, 250:13,	268:21, 272:21,	283:7, 283:18
265:18	252:16, 254:5,	273:17	marked
least	258:8, 258:16,	looked	233:2, 233:5,
235:15, 246:17,	258:22, 266:6,	231:3, 240:15	236:3, 246:7,
250:19, 251:9,	270:5, 273:7,	looking	264:5
265:6, 265:8,	274:2	226:17, 241:9,	markings
265:20, 265:22,	limited	241:15, 251:3,	233:8, 235:11,
271:10, 271:11	248:1, 248:2	268:19, 276:19	246:21
leaves	line	looks	maryland
228:1	242:2, 243:12,	233:13, 246:22,	221:14, 283:5,
left	250:14, 270:17	250:13	284:7
272:4	linked	loop	matter
less	260:10	247:16, 247:17,	245:13, 254:17
242:18	list	248:1, 248:3,	may
	251:19, 268:16	248:6, 248:8,	247:19, 254:18,

255:17, 269:12, 274:6, 275:9, 276:2, 278:1, 280:10 maybe 242:2, 248:17, 250:4, 256:16, 273:9 mean 245:16, 248:2, 249:1, 261:19, 273:8 meaning 237:8, 271:13 meant 228:15 meet 231:17 meets 240:3 megahertz 250:20, 251:7, 251:8, 251:13, 251:15, 251:17, 251:20, 252:1 mentioned 225:15, 227:10, 229:4, 242:6, 277:2 message 228:13 method 272:8, 273:22, 274:3 methods 267:21, 270:6, 273:18, 273:20, 273:21 middle 231:3 might 248:15 mind 226:14, 233:6, 233:18, 253:15 minimal 245:4 minimize 234:8	minutes 261:22, 278:5 mischaracterizes 271:7 mobile 226:4, 226:7, 226:10, 227:18, 228:19, 229:8, 232:14, 236:11, 236:14, 238:20, 238:22, 239:16, 240:1, 240:7, 240:9, 240:14, 242:7, 243:20, 244:13, 245:6, 245:18, 252:17, 257:12, 262:13, 262:15, 267:2, 270:19, 274:18, 276:15 mobiles 260:22, 275:17, 276:13 modulate 265:8, 275:3, 277:4 modulated 266:11, 266:12, 266:16, 266:17, 269:6, 270:4, 271:12, 272:8, 272:22, 274:10, 274:15, 275:12, 275:22, 276:5 modulating 265:19, 276:17 modulation 267:8, 267:13, 270:6, 273:17, 273:20, 273:21, 274:3, 274:9, 274:22, 277:5, 277:7 moment 227:13, 230:22 money 262:20 more 242:18, 255:22,	256:2, 259:15, 259:17, 259:19, 260:2, 260:15, 261:20, 262:2, 262:3, 262:4, 262:8, 262:9, 262:14, 262:21, 263:12, 270:19, 271:2, 277:21, 278:14, 278:20, 280:11 morning 225:6 most 252:15, 254:6, 255:6, 273:12 mounted 252:15, 257:10 move 232:17 moveable 239:21, 240:2, 240:4, 240:14 moves 227:15, 229:4, 230:4, 230:13, 252:20, 260:8, 261:4 moving 226:5, 226:8, 226:11, 226:12, 227:2, 227:4, 227:5, 227:10, 227:15, 227:21, 228:3, 229:4, 230:12, 231:8, 231:9, 231:15, 232:2, 232:8, 232:13, 255:3, 256:12, 257:2, 261:8 mss 236:12, 240:1, 240:7, 240:13, 240:15, 240:16, 241:1, 241:5, 242:7, 244:4, 244:6, 257:2,	257:5, 257:10, 257:12, 257:15, 258:2, 258:4, 258:11, 258:15, 258:21, 259:4, 259:8, 259:12, 261:15, 262:9 much 255:4, 255:14, 255:22, 256:2, 259:19, 260:15, 262:1, 262:3, 262:4, 262:8, 262:9, 265:17 multipath 255:13, 255:17, 255:20, 255:22, 256:4, 259:6, 259:13, 259:16, 259:18, 260:1, 260:2, 260:14, 261:3, 261:8, 261:14 multiple 259:21, 260:18, 267:6, 267:21, 268:8, 268:12, 269:15, 269:22, 270:10, 273:13, 273:22 must 256:2 <hr/> N <hr/> name 275:1 necessarily 276:3 necessary 272:15 need 228:13, 230:6, 230:9, 230:22, 232:3, 241:12, 243:6, 245:10, 250:22, 251:21, 258:18, 263:12, 265:9, 267:19,
---	---	---	---

271:13, 272:7, 278:6, 280:20 needed 279:10 needs 230:14, 231:15, 231:19, 232:4 network 226:3, 226:10, 228:18, 229:6, 229:8, 229:9, 230:2, 231:11, 232:5, 249:5, 251:16, 268:9, 268:20, 277:9 networks 228:10, 229:1, 251:18, 262:22, 268:18, 269:5, 273:2 never 275:14 new 222:6, 229:14 next 268:22 nice 276:11 nonexistent 237:13 nor 236:16, 244:19, 275:15 normally 243:20, 244:13 not 230:6, 230:9, 232:2, 236:10, 237:4, 237:17, 237:21, 238:8, 238:17, 238:19, 239:8, 239:13, 240:6, 241:1, 241:20, 242:22, 248:16, 248:21, 248:22, 249:8, 249:14, 251:18, 252:3, 254:7,	255:20, 260:20, 263:7, 267:6, 267:13, 267:16, 269:3, 269:5, 269:22, 270:3, 270:4, 272:2, 272:6, 272:12, 272:17, 273:4, 273:10, 273:11, 274:1, 276:3, 276:9, 278:14, 278:16, 279:13, 280:5, 280:18 notary 221:13, 283:1, 283:5, 284:6 notation 235:12 notations 246:21 noted 242:21 notes 264:10 nothing 246:15, 280:9 notice 221:11 november 284:3 now 229:12, 235:2, 246:22, 249:13, 263:7, 266:18, 267:8, 271:20 nw 222:6 <hr/> O <hr/> objection 261:11 obstacles 252:16, 254:6, 254:9, 255:4, 255:7 obvious 233:8, 236:16, 238:11, 239:14,	244:20, 245:11, 246:15, 269:6, 273:5 obviousness 238:5, 238:6 occur 236:20, 245:1, 245:16 occurred 283:18 occurring 259:18 occurs 227:3 off 233:1, 249:11, 279:3, 279:18, 281:1 office 220:1, 283:19 offices 222:12 often 259:13 okay 226:3, 226:9, 226:19, 230:11, 230:16, 230:21, 232:6, 232:16, 233:11, 233:22, 234:6, 234:16, 234:22, 236:9, 237:2, 237:15, 238:13, 240:18, 241:22, 242:3, 243:5, 247:2, 247:13, 247:14, 248:22, 250:15, 252:6, 252:9, 252:11, 253:14, 253:18, 256:6, 256:20, 256:21, 257:8, 257:11, 257:15, 258:1, 258:20, 259:3, 261:5, 262:11, 263:20, 264:12, 264:16, 264:20,	265:3, 265:4, 265:22, 266:8, 267:11, 267:18, 269:1, 269:12, 269:19, 270:8, 270:14, 270:16, 271:1, 272:11, 274:5, 275:9, 277:18, 278:9, 279:12, 280:8, 280:15 old 246:11 once 265:2 one 225:22, 228:1, 229:5, 229:15, 230:4, 230:13, 241:19, 248:19, 249:10, 251:12, 254:18, 255:16, 255:17, 256:15, 258:19, 259:9, 260:11, 262:6, 265:5, 267:2, 268:13, 273:1, 274:16, 276:20, 276:22, 280:10, 280:18, 280:19 ones 265:22, 268:16 only 230:14, 254:7, 255:20, 262:11 onto 246:3, 264:3, 275:12, 276:5 open-ended 248:11 operation 277:2 operator 251:22 opinion 231:18, 247:22, 253:3, 254:3, 268:13, 271:3
--	--	--	--

	P		
opinions		276:6	performs
234:3	page	particularly	226:1, 226:4,
opposite	224:2, 224:7,	270:20, 271:2,	227:6, 227:11,
236:20, 238:12,	233:19, 234:11,	273:15	227:22, 230:1
245:1, 245:15	234:13, 235:15,	party	period
optional	246:14, 246:18,	283:15	239:5
232:9	247:4, 248:14,	passage	person
order	250:2	237:20, 244:7,	245:13, 266:10,
231:17, 256:3,	pages	245:9	272:18, 273:5
272:8, 272:21	220:21, 246:19,	past	petitioner
ordinary	250:3	249:4	220:6, 222:2,
245:13, 251:12,	paneth	patent	225:4, 278:14,
266:10, 272:19,	246:1, 247:15,	220:1, 220:3,	280:9
273:5, 275:15	247:22, 248:7,	220:9, 220:12,	phase
orient	248:20, 249:8,	220:15, 222:10,	260:14, 266:17
243:8	249:14, 250:5,	224:9, 224:10,	phone
other	250:18, 253:10	224:11, 226:18,	226:22, 227:4,
228:8, 229:16,	paneth's	232:21, 233:14,	228:16, 228:20,
230:13, 235:12,	249:1, 249:19,	233:16, 234:4,	228:21, 229:3,
239:19, 241:20,	249:22	235:4, 235:6,	229:9, 229:10,
242:21, 249:15,	paragraph	235:7, 235:12,	229:11, 229:14,
254:19, 257:6,	230:18, 230:19,	235:21, 236:7,	229:22, 230:3,
259:10, 265:22,	231:1, 231:4,	236:10, 236:16,	230:6, 230:12,
266:5, 272:21,	236:6, 236:9,	237:21, 238:16,	231:5, 231:15,
277:15, 280:6	237:10, 237:16,	238:19, 240:1,	231:18, 232:1
others	238:16, 238:19,	240:5, 240:11,	physical
268:15	239:11, 240:5,	241:13, 243:12,	235:3, 235:14,
our	243:7, 244:3,	246:3, 246:18,	247:5
269:13, 277:20,	244:16, 244:17,	249:14, 250:2,	please
279:8	244:19, 247:12,	264:2, 264:3,	232:19, 234:18,
out	247:14, 252:10,	270:15	246:2, 246:4
227:15, 235:3,	252:12, 253:9,	patents	pllc
237:10, 239:10,	253:12, 264:19,	225:16, 225:18,	222:12
241:22, 243:15,	265:1, 265:5,	228:3, 279:7	point
243:18, 244:9,	267:12, 267:22,	path	234:17, 237:16,
245:22, 251:19,	268:21, 268:22,	254:18, 254:20,	238:13, 239:4,
256:7, 263:21,	269:2, 271:9,	259:4	246:12, 250:10,
277:21	274:7	paths	253:19, 255:16,
outlined	paragraphs	260:1, 260:10	259:10, 266:14,
262:12	251:3	paying	267:11, 272:12,
over	parse	228:22	273:2, 279:21
243:10, 249:4,	256:6	perform	pointed
251:9	part	225:17, 230:6,	251:5, 251:19,
overall	244:17, 246:11,	239:9	256:8
268:19, 268:20	265:9, 268:1,	performed	points
own	270:5, 271:12	230:15, 240:22,	225:14, 239:3
252:4	particular	277:6	portable
owner	236:9, 275:13,	performing	242:14, 260:19
220:9, 222:10		226:22, 261:2	

<p>portion 238:15, 242:4, 250:17 posita 236:17, 238:6, 244:20, 265:7, 269:6, 271:10, 272:5, 272:6 position 237:3, 253:20 possible 236:19, 245:1 power 236:13, 236:14, 236:21, 237:5, 237:17, 238:22, 239:1, 239:6, 239:7, 239:16, 239:17, 240:9, 240:10, 243:13, 243:14, 243:17, 243:18, 244:3, 244:5, 244:8, 244:9, 244:10, 245:2, 245:4, 245:6, 245:17, 245:18, 260:22 powered 228:17 premise 257:7, 261:12 present 223:3, 262:12, 270:18, 283:19 pretty 256:9, 265:17 previous 229:21, 234:1, 242:19, 261:6, 269:13, 274:7, 276:19, 276:22 previously 242:5, 262:12 prior 280:18 problems 227:20 procedure 226:13</p>	<p>proceedings 279:10 process 250:4, 256:1, 256:3, 266:11 processing 260:22, 261:3, 262:2, 262:8 professional 221:12 promise 225:9 protocol 231:7, 231:10, 231:16, 231:20, 231:21, 232:3, 232:9, 232:12, 232:15 proven 268:17 provide 251:11, 268:14, 269:3, 272:7 provided 229:20, 261:7 provides 251:8 pss 242:14, 244:6 public 221:13, 283:1, 283:5, 284:6 pull 232:20, 233:14, 235:1, 235:3, 236:1, 245:22, 246:3, 247:9, 263:21, 264:2, 264:16 purposes 265:13, 268:4, 271:18 pursuant 221:11 put 263:3, 272:8 putting 249:19</p>	<p>Q quality 251:9 question 227:7, 227:21, 228:13, 229:15, 237:8, 237:13, 240:12, 240:21, 241:4, 241:11, 241:14, 248:11, 248:14, 248:17, 250:9, 251:1, 251:2, 253:11, 253:15, 253:17, 256:14, 256:17, 257:7, 261:13, 266:13, 266:14, 276:8, 276:10, 280:5, 280:16 questioning 280:3 questions 256:8, 265:2, 269:13, 277:21, 278:14, 278:17, 278:20 quick 277:20 quite 275:6 R radio 242:10, 242:12, 242:13, 242:15, 243:9, 243:11, 243:13, 251:13 rake 260:3 range 250:6, 252:2 ranges 251:6 rapid 255:22, 259:19, 260:15, 261:2, 262:4, 262:7</p>	<p>rapidly 260:6 rast 223:4 rate 255:14, 259:19, 262:4, 262:7 rating 254:12 rayleigh 252:13, 252:19, 253:21, 254:1, 254:17, 255:9, 259:12, 261:14, 261:16, 262:2 re-ask 229:15, 256:18 read 228:3, 232:7, 237:19, 244:2, 244:7, 244:15, 250:16, 253:10, 264:22, 272:19, 282:3 reading 251:20, 253:9, 253:16 reads 231:4, 243:12, 247:15, 265:5 ready 263:9 realization 250:3 realizes 228:5 really 250:22, 256:8 realtime 221:13 reason 269:19, 272:10, 273:21 reasons 261:6 recall 249:11 receive 229:10, 258:4</p>
--	--	--	--

received 244:5, 254:10, 255:11, 259:5, 261:17, 261:20, 262:1, 266:12 receiver 254:22, 255:2, 255:5, 255:15, 259:14, 259:17, 260:2, 260:4, 263:4 receiver's 255:1 receivers 262:21, 263:2 receives 258:14, 258:20 receiving 254:21, 260:19 recess 263:17, 278:10 record 226:15, 233:1, 234:18, 280:18, 281:1, 283:11 record's 242:1 refer 249:6 reference 246:1, 246:13, 249:8, 256:5, 263:21 references 249:6, 249:10, 250:5, 272:21 referencing 244:8 referred 226:21, 229:1, 229:6, 230:19, 239:19, 239:21, 259:13, 260:1, 275:4, 277:10 referring 225:19, 238:1, 242:5, 247:11, 250:6, 253:12,	255:12, 261:13, 266:18 refers 257:5 regard 239:20, 276:10 regarding 236:20, 245:2, 280:7 register 229:14 registered 221:12, 227:19 registering 231:10, 232:4 registers 228:17 registration 228:10, 228:12, 228:15, 229:2, 230:1, 230:7, 230:10 regular 280:20 relate 234:4 relates 270:18 relating 232:20, 233:15, 279:10 relationship 236:20, 238:12, 245:1, 245:15 relative 244:11 relatively 243:19, 244:5, 245:5 relevant 236:15, 240:10, 240:17 reliable 262:21 remains 230:4 render 239:13	reorient 231:1 rephrase 258:3 report 244:16 reported 220:22 reporter 221:12, 221:13, 280:10, 280:12, 280:15, 283:1, 283:4 represented 283:15 require 231:5 required 236:15, 237:22, 238:17, 239:1, 240:10, 240:17, 245:5, 260:22 requirement 232:6 requirements 240:3, 272:15 reread 238:15 responding 245:7 responsible 226:13 restate 258:18 restating 253:15 result 261:19 reverse 267:3 review 241:13, 248:20 reviewed 253:14 reviewing 241:16 rf 265:19, 266:12,	269:6, 274:10 rhoades 222:18, 283:19 richardson 222:3, 224:3, 225:5, 232:19, 233:12, 234:7, 234:17, 234:22, 235:5, 235:20, 246:2, 246:9, 247:9, 263:10, 263:15, 263:19, 264:1, 264:16, 277:19, 278:7, 278:12, 278:21, 279:3, 279:12, 279:19, 280:8, 280:21 right 225:6, 225:12, 246:22, 256:20, 256:22, 263:7, 263:15, 273:15, 275:13, 278:3, 279:2 roads 254:8 rockwall 222:14 room 279:13 rpr 220:22 ryan 222:3, 263:6 <hr/> S <hr/> s 263:13, 263:14 said 229:13, 238:16, 240:4, 241:1, 246:17, 255:9, 256:15, 263:1, 266:6, 267:19, 271:9, 271:20, 277:3 same 233:5, 234:12,
---	--	---	---

235:7, 247:6, 252:2, 255:13, 259:22, 260:5, 274:17, 274:20, 275:1, 275:2, 275:18, 276:12, 277:4, 282:4 sanford 222:17 say 226:12, 232:11, 244:3, 248:5, 248:22, 255:12, 266:3, 268:6, 274:2, 276:11 saying 236:10, 237:4, 237:10, 238:10, 239:4, 239:7, 263:7, 267:13, 272:5, 272:12, 272:17 says 238:19, 241:18, 242:6, 250:21, 250:22, 251:8, 271:21, 273:14 scanned 246:19 scenario 227:14 screen 233:5, 233:13, 234:8, 234:12, 235:1, 235:17, 246:4, 247:6, 247:10, 264:3, 264:14 script 233:6 second 227:3, 227:9, 227:17, 227:19, 230:7, 232:6, 236:11, 237:8, 237:9, 237:11, 237:18, 237:22, 238:10, 238:17,	238:20, 239:5, 239:8, 239:14, 240:6, 240:16, 240:19, 241:1, 241:6, 242:8, 242:13, 242:15, 243:10, 244:17, 247:14, 249:16, 252:12, 276:20 secondly 238:4 section 238:1 see 225:11, 231:12, 234:9, 236:22, 240:16, 242:16, 243:22, 246:21, 247:20, 248:18, 250:12, 252:21, 263:15, 265:15, 269:10, 270:21, 273:9, 278:21 segment 251:20 segments 250:20, 251:14, 252:1 send 277:15 sends 276:16 sense 276:10 sent 243:14 sentence 237:3, 238:18, 240:5, 244:15, 244:18, 247:15, 252:13, 265:4, 268:1, 268:2 set 232:16, 243:19, 283:8, 284:1 setting 244:8, 244:10 sheet 282:7	short 256:8 shorten 250:4 shortest 225:10 shorthand 283:1 should 235:7, 246:1, 263:22 shouldn't 246:16 showing 242:6 shown 234:12, 235:16, 247:6 sic 244:14 side 277:20 sign 279:3 signal 228:5, 228:6, 236:13, 238:21, 239:6, 239:7, 239:15, 240:8, 243:13, 243:18, 244:9, 245:17, 254:12, 254:22, 255:13, 255:17, 255:18, 255:21, 255:22, 256:4, 256:5, 259:16, 259:18, 259:22, 260:7, 261:16, 261:20, 265:18, 266:17, 267:9, 275:12, 276:5, 276:16 signals 236:21, 243:10, 245:2, 254:10, 255:11, 255:12, 256:5, 258:5, 258:7, 258:12,	258:15, 258:20, 258:21, 259:5, 260:3, 260:6, 260:8, 260:11, 260:12, 260:15, 261:3, 261:15, 262:1, 262:3, 262:5, 262:6, 265:12, 268:3, 271:17, 277:15 signature 233:20, 282:10 signature-ollc0 284:4 signed 282:7 significantly 246:13, 247:18, 252:17, 253:22, 254:4, 261:15 similar 245:9, 247:19, 269:9 simply 229:7 since 225:21, 241:22, 268:11, 271:1 single 239:4 sitting 269:20 situation 226:8, 226:9, 254:22, 258:2 situations 236:19, 237:5, 244:22, 245:14, 253:4, 256:11, 256:16, 258:4 skill 245:14, 251:12, 266:10, 272:19, 273:5, 275:15 skimming 233:7 slightly 229:18, 275:10,
---	---	---	--

276:2 slowly 256:9 smith 222:11, 222:12, 261:11, 263:6, 263:14, 278:3, 278:9, 278:16, 279:11, 279:16, 280:12, 280:13, 280:17 some 237:4, 238:14, 241:16, 247:19, 251:3, 251:11, 256:8, 258:4, 259:12, 273:21, 274:1 someone 272:5 something 225:17, 248:15, 256:15, 268:6 somewhat 273:10 sorry 241:3 sounds 278:3, 278:9 spatial 260:18 spatially 265:14, 271:19 speak 266:20, 280:5 specific 238:2, 239:9, 252:4, 267:9 specifically 231:2, 243:12, 249:5, 252:10, 266:21, 274:12 specified 266:20 spectral 268:14, 268:19 speech 251:9	speeds 252:18, 254:8, 255:11 spent 261:22, 262:20 spot 263:7, 263:8, 263:11 spread 275:19, 276:16, 277:14, 277:15 spreading 275:4, 275:5, 277:9, 277:11 spreads 277:11 standard 231:7, 231:9, 231:16, 231:20, 232:3, 232:9, 232:12, 249:7, 249:9, 249:12, 249:16, 249:21 standards 249:5 standing 228:21 standpoint 254:14, 254:16 start 239:10, 243:7, 259:16, 263:20 started 237:10 starting 250:2 state 221:14, 237:21, 244:19, 251:5, 267:21, 283:5, 284:7 stated 239:22, 248:19, 259:14, 266:7 statement 257:4, 265:7, 266:2, 271:8, 271:10, 274:2	statements 237:20 states 220:1, 224:9, 224:10, 224:11, 252:13, 269:2, 270:17 station 226:5, 226:6, 226:8, 226:11, 226:12, 227:1, 227:2, 227:5, 227:11, 227:15, 227:16, 227:18, 227:19, 227:22, 228:4, 229:4, 229:15, 230:8, 230:13, 231:6, 231:9, 231:16, 231:19, 231:22, 232:2, 232:8, 232:14, 239:21, 240:3, 240:4, 240:15, 242:11, 243:15, 243:21, 244:13, 244:14, 245:3, 252:14, 253:21, 254:5, 255:6, 255:15, 256:12, 256:13, 257:2, 257:16, 257:19, 259:7, 259:11, 259:19, 260:4, 261:9, 261:10, 261:17, 262:13, 262:15, 262:17, 267:2, 274:20, 276:15 stations 227:6, 227:12, 252:3, 252:5, 257:21, 260:17, 274:17, 274:18, 275:18, 276:13 stay 260:5 sterne 222:4	still 232:4, 245:5, 275:12, 276:2, 279:8 stop 240:11 strategy 262:14 streets 254:8 strength 255:21 strongest 255:18, 255:19, 260:3, 260:6, 260:10, 262:6 subsection 239:11, 239:12 subsequent 230:7 substantive 280:2 such 283:9, 283:10, 283:12 sufficient 248:18 suite 222:20, 283:20 suited 273:15 sure 229:18, 233:7, 246:15, 250:10, 253:16, 264:9, 276:20, 278:13, 280:4 switch 243:16 sworn 225:3, 283:9 system 247:17, 248:3, 248:6, 248:9, 248:16, 248:21, 249:1, 249:2, 249:7, 249:9, 249:20, 250:1,
--	--	--	--

251:21, 254:16, 256:22, 265:11, 267:15, 268:20, 269:8, 269:9, 271:2, 271:15, 272:4, 272:9, 274:22, 277:13, 277:14, 277:17 systems 247:17, 247:18, 248:1, 265:11, 266:15, 268:2, 269:18, 270:2, 270:3, 271:16, 271:22, 273:19, 274:4	technical 254:14, 254:16 technician 223:4, 234:21, 246:5 technique 267:13 techniques 266:10, 268:12, 269:15, 269:21, 270:1, 270:11, 271:5, 272:13, 273:13 technology 259:9, 263:2 tell 228:15 telling 229:8 ten 278:5 term 229:16 terminology 228:8, 247:19, 276:21 terrestrial 255:4 testified 225:3 testimony 230:5, 231:14, 261:7, 280:7, 282:4, 282:6, 283:11 texas 283:20 text 241:16, 244:2 th 284:2 than 236:14, 238:22, 239:16, 240:9, 241:11, 242:21, 244:5, 245:18, 247:18, 252:17, 253:6, 254:1,	255:5, 255:14, 259:19, 261:9, 261:16, 262:15, 265:13, 266:14, 266:16, 268:4, 268:15, 271:18, 275:7 thank 225:8, 226:19, 227:8, 234:22, 246:9 thanks 279:2 that's 226:22, 228:2, 228:20, 229:6, 232:9, 232:11, 232:21, 233:17, 234:12, 234:19, 235:6, 235:9, 235:16, 235:21, 238:2, 238:13, 239:8, 239:12, 240:21, 241:20, 243:8, 246:10, 248:16, 249:18, 250:7, 250:21, 251:15, 254:7, 255:3, 257:10, 258:10, 262:8, 264:7, 266:13, 267:6, 268:10, 271:20, 272:4, 273:2, 273:4, 276:7, 277:18 their 228:22, 265:12, 268:3, 270:7, 271:17, 275:3, 277:4, 277:14 them 280:20 then 227:5, 228:11, 228:14, 229:9, 230:4, 236:1, 237:15, 238:4, 238:10, 240:15,	240:18, 241:4, 243:3, 243:14, 254:11, 255:18, 260:8, 261:5, 262:11, 263:16, 267:3, 267:12, 268:22, 272:20, 274:9, 275:11, 280:9 there 227:10, 228:9, 228:11, 230:21, 234:9, 236:8, 236:19, 238:2, 238:11, 238:12, 239:8, 240:11, 241:9, 242:1, 242:3, 244:22, 246:16, 247:13, 249:22, 251:6, 253:14, 256:11, 263:1, 264:20, 269:19 there's 233:8, 235:11, 238:9, 239:4, 239:5, 246:15, 250:3, 254:9, 262:7, 264:9, 273:3, 274:21, 276:17 therefore 237:12, 240:4 these 253:3, 256:3, 261:2, 263:3, 265:11, 267:20, 268:2, 268:11, 269:22, 270:2, 270:3, 271:16, 273:2, 279:8, 279:9 they 234:3, 243:9, 255:14, 269:17, 270:5, 273:19, 275:1, 275:2, 275:3, 275:19,
T			
take 230:22, 250:12, 259:22, 263:11, 268:21, 273:6, 277:20 taken 263:17, 278:10, 283:10 taking 260:8, 260:9, 277:9 talk 277:20, 279:15, 280:1 talking 225:21, 267:7, 274:8, 275:10, 276:2, 276:3, 276:5 tdma 265:10, 266:1, 266:9, 267:14, 268:13, 269:8, 269:14, 270:9, 271:4, 271:15, 272:14, 273:11, 273:18, 274:4, 274:13 teaches 270:5			

276:13, 277:4, 277:15 they're 255:15, 260:9 thing 230:14, 238:9, 248:19 things 250:11, 256:7, 258:8, 258:16, 258:22, 275:10, 276:3 think 227:7, 230:16, 230:19, 232:16, 238:13, 244:16, 249:13, 253:10, 263:8, 263:10, 268:17, 269:12, 269:20, 270:9, 272:11, 272:18, 272:20, 273:8, 273:16, 274:6, 274:12, 275:9, 275:15, 277:18, 277:19, 280:10, 280:22 thinking 270:3 this 228:10, 230:19, 231:4, 234:2, 234:3, 236:9, 237:3, 238:1, 238:7, 239:9, 239:10, 240:18, 242:4, 242:18, 243:7, 244:21, 245:8, 246:5, 246:11, 246:13, 247:12, 248:18, 250:4, 251:4, 251:16, 251:20, 251:21, 253:2, 256:9, 256:14, 259:3, 260:16, 261:2, 263:4, 265:7, 269:12,	270:9, 271:10, 274:6, 278:15, 278:19, 284:2 those 253:14, 258:7, 258:14, 258:15, 258:21, 262:15, 262:16, 262:18, 263:2, 263:3, 265:13, 266:9, 266:15, 267:16, 268:4, 268:14, 271:18, 273:12 though 241:17, 247:19, 270:8, 275:12 thought 275:14 three 227:20, 273:12, 280:1 through 226:11, 233:7, 246:12, 246:14, 246:19, 246:22, 248:14, 250:2, 250:4, 256:9, 258:8, 258:16, 258:22, 264:8, 276:19 throw 249:22 tiedemann 249:6 time 228:10, 229:2, 234:3, 247:12, 255:16, 260:11, 260:13, 260:17, 261:1, 262:6, 262:22, 263:12, 266:5, 269:18, 270:12, 278:15, 279:18, 280:6 today 225:10, 269:20 today's 279:6	top 249:11 totally 272:4 tower 252:15, 253:5, 253:22, 256:13, 257:19 towers 257:22 track 256:17 trademark 220:1 transcript 224:5, 233:3, 236:4, 246:8, 264:6, 280:14 transcription 282:5 transcripts 279:7 transmission 236:13, 236:14, 237:17, 238:22, 239:1, 239:6, 239:16, 239:17, 240:8, 240:10, 243:13, 245:4, 245:5 transmit 239:15, 258:12 transmitted 243:10, 244:4, 245:18, 265:18, 277:8 transmitter 236:11, 237:8, 237:9, 237:11, 237:14, 237:18, 237:22, 238:10, 238:17, 238:20, 239:5, 239:8, 239:14, 240:6, 240:16, 240:20, 241:2, 241:6, 241:18 transmitter-rece- iver 242:8, 242:9,	242:10, 242:13 transmitters 241:19 transmitting 236:12, 238:21, 240:8, 277:14 travel 252:18 traveling 254:7, 255:10 traverse 258:8, 258:16, 258:22 trees 252:16, 258:8, 258:17, 259:1, 259:7 trial 220:3 tripping 276:7 true 234:3, 282:4, 283:11 try 256:7, 279:18 trying 238:14, 253:18, 262:20, 276:9, 276:11 turn 230:18, 242:2, 252:7, 264:18, 270:14 turned 279:14 turning 233:18 turns 228:16, 229:22 two 226:20, 227:20, 239:3, 241:19, 251:6, 260:2, 260:10, 260:12, 262:7, 279:9 tx 222:14, 222:21
--	---	---	--

type 226:21, 227:3, 227:9, 227:12, 259:12, 262:20, 263:2, 274:4 types 226:1, 235:12, 269:4, 270:6 typically 227:22, 257:21, 260:2, 260:5, 260:11, 260:18, 270:3	271:16, 272:18, 273:19, 274:15, 274:20, 275:1, 275:2, 275:18, 275:19, 276:14, 276:21, 279:9 used 228:2, 228:12, 228:20, 242:10, 242:13, 251:18, 267:1, 267:3, 267:4, 267:14, 269:4, 269:8, 269:17, 269:22, 270:10, 271:4, 271:5, 271:8, 271:21, 272:10, 272:13, 273:11, 273:18, 274:1, 275:5, 276:12 useful 273:11 uses 266:21, 274:16, 277:3 using 228:21, 231:7, 231:9, 231:16, 231:20, 232:8, 249:2, 250:1, 256:5, 265:10, 266:9, 267:20, 271:14, 279:17	254:2, 254:7, 254:9, 254:11, 255:3, 255:9, 256:12, 257:3, 257:10, 257:12, 259:14, 259:15, 260:5, 260:8, 261:3, 262:1, 262:3, 262:10, 262:13 vehicle's 259:17 vehicles 260:16, 260:20 vercauteren 249:13 versions 255:13, 255:17, 259:22, 260:7 versus 239:6, 254:6, 259:10 very 240:22, 245:20, 266:3, 275:7 virtual 220:17 virtually 221:2 volkswagen 220:5, 279:10 volume 220:17	283:19 was 238:14, 241:16, 245:9, 249:13, 251:2, 260:10, 260:22, 272:20, 280:15, 283:8, 283:10, 283:15 washington 222:7 wasn't 261:1, 263:5 way 240:18, 242:12, 242:14, 243:15, 248:18, 265:21, 275:15, 276:11, 280:14 we'll 225:11, 273:9, 278:18 we're 253:9, 254:21, 261:13, 263:10, 267:7, 267:8, 272:11, 280:22 we've 225:15, 234:2, 239:20, 249:4, 270:9 welcome 225:7, 278:12 well 225:12, 230:20, 232:16, 236:2, 237:7, 237:19, 239:10, 247:10, 248:4, 254:6, 256:4, 268:16, 268:18, 269:17, 271:21, 274:3, 275:7, 278:3, 280:21 well-known 269:15, 269:22 were 225:21, 238:11, 242:19, 253:12,
U	V	W	
understand 229:16, 236:17, 238:6, 238:11, 244:20, 245:14, 251:13, 251:21, 256:14, 261:5, 272:22 understood 265:7, 271:11, 273:8 unit 226:5, 226:7, 226:10, 227:18, 232:14, 242:8, 242:9, 242:10, 252:17 united 220:1, 224:9, 224:11 unlike 251:16 update 228:11, 229:7, 230:15 upon 226:8 use 229:19, 231:22, 232:3, 247:19, 252:1, 265:12, 266:15, 267:16, 268:3, 270:3, 270:4, 270:5,	valid 228:19, 228:20 validates 228:19 validation 228:22 value 243:19, 244:11 various 225:13, 249:5, 268:11 vehicle 252:18, 252:20,	walk 256:9 walking 248:14 want 252:7, 256:18, 263:20, 264:8, 264:18, 264:22, 276:20, 278:5, 280:4, 280:13, 280:19 warren 222:17, 222:18,	

262:18, 267:1, 269:14, 269:17, 270:10, 271:5, 273:17, 274:6, 274:8, 274:9, 274:19, 277:1, 279:7 weren't 263:1 what 225:11, 228:15, 229:16, 237:13, 241:12, 242:19, 248:2, 250:7, 250:21, 251:12, 254:3, 254:14, 257:5, 259:19, 260:10, 267:6, 271:20, 276:7, 278:5 what's 247:6, 255:8, 264:13, 275:3, 277:10 whatever 249:21, 253:16 when 227:4, 227:14, 228:3, 228:16, 228:17, 229:3, 229:13, 232:1, 238:15, 248:22, 253:6, 254:2, 255:12, 258:14, 258:20, 263:6, 263:8, 265:10, 266:9, 267:20, 268:19, 271:14, 276:14 where 226:9, 227:10, 229:8, 231:4, 236:19, 237:5, 244:22, 245:4, 245:16, 250:6, 253:4, 254:8, 258:2, 271:9, 272:9, 277:1	whereas 242:12 whereof 284:1 whether 249:19, 276:5, 276:15 which 226:3, 226:15, 235:6, 237:10, 242:5, 253:9, 253:11, 254:11, 256:4, 271:5, 273:14 while 233:4, 233:17, 235:9, 246:10, 259:11, 264:7, 266:15 whole 275:20, 276:17, 279:17 whose 283:7 why 251:15, 254:16, 259:7, 260:17, 269:20, 271:3, 278:7 will 225:9, 246:5, 257:9, 261:13, 277:19 willing 242:22 wireless 232:15, 247:16, 247:17, 248:1, 248:3, 248:6, 248:8, 248:16, 252:5, 254:16, 265:18, 269:15 with 227:1, 227:14, 227:19, 227:20, 228:17, 229:12, 229:14, 229:15, 230:2, 230:7,	231:1, 231:6, 231:8, 231:10, 231:15, 231:19, 232:2, 232:4, 232:8, 234:1, 242:11, 242:14, 249:8, 249:15, 249:20, 250:3, 252:3, 252:4, 254:2, 256:21, 257:4, 257:6, 257:7, 257:16, 259:5, 263:20, 266:4, 267:14, 268:7, 269:7, 269:22, 271:4, 271:14, 272:1, 272:3, 272:13, 273:22, 275:3, 277:10, 278:19, 280:5, 280:9, 280:21, 283:18 within 266:19, 283:5 without 236:17, 238:6, 244:20, 248:14 witness 263:13, 278:18, 279:1, 279:14, 280:4, 283:7, 283:13, 283:18, 284:1 wll 247:16 word 244:12 wording 228:2, 229:19 words 257:6, 267:17 work 251:7 worked 262:19 would 226:12, 231:21, 231:22, 232:2,	232:11, 236:16, 236:18, 238:6, 238:7, 238:8, 238:10, 241:7, 244:19, 244:21, 245:11, 245:14, 245:16, 249:21, 250:18, 250:21, 251:13, 251:18, 251:20, 251:21, 252:2, 252:3, 252:4, 254:11, 254:17, 255:14, 256:10, 257:5, 257:11, 257:18, 258:7, 258:11, 258:15, 258:21, 258:22, 259:4, 259:7, 259:12, 260:5, 261:9, 261:20, 262:9, 262:16, 265:7, 265:9, 266:3, 266:4, 266:9, 266:11, 267:2, 267:4, 267:16, 267:19, 268:14, 269:5, 269:14, 270:8, 271:10, 271:13, 272:3, 272:7, 272:17, 272:19, 273:9, 274:3, 274:20, 275:8, 275:11, 275:15 wouldn't 245:11, 248:13, 253:15, 257:4, 262:13, 265:20, 266:6, 273:4, 275:21 <hr/> Y <hr/> yeah 235:20, 241:3, 263:10, 278:7, 279:1, 279:2 yes 226:1, 231:13,
--	--	---	---

<p>233:21, 234:5, 234:15, 235:18, 237:1, 242:17, 242:21, 244:1, 247:7, 247:21, 252:22, 254:4, 257:1, 257:14, 257:17, 258:6, 258:13, 259:2, 264:15, 265:16, 269:11, 270:13, 270:22, 274:11, 279:14 yesterday 225:22, 228:9, 230:20, 231:3, 233:6, 249:12, 279:6 york 222:6 you'd 225:21 you'll 258:18, 273:16, 273:19, 278:13 you're 225:18, 227:14, 229:16, 237:3, 237:12, 237:16, 241:11, 253:19, 254:2, 256:21, 267:12, 272:12 you've 237:19, 265:2, 266:7 your 227:7, 227:20, 228:12, 228:13, 229:20, 230:5, 230:16, 231:14, 232:17, 233:19, 233:20, 234:1, 234:3, 236:5, 236:6, 237:8, 240:12, 241:13, 242:19, 247:11, 247:22, 248:17, 250:8, 252:7,</p>	<p>253:3, 253:11, 253:20, 254:3, 256:14, 256:17, 257:7, 261:5, 261:7, 261:13, 264:19, 271:3, 276:8, 276:9, 276:19, 276:22, 278:22, 279:22, 280:2, 280:3 yourself 231:1, 243:8, 265:1 . .2475 222:15 .2955 222:22 .8729 222:8 0 01101 220:11 01105 220:14 03 278:10 1 278:10, 278:11, 281:1, 283:22 10 224:10, 224:11, 264:5, 270:17, 278:8, 283:22 11 263:11, 263:13, 263:14, 278:11, 283:22 1100 222:6 12 263:17, 263:18 121 264:19, 265:1,</p>	<p>267:12, 267:22, 271:9, 274:7 1212 222:19, 283:20 122 268:21, 269:2 125 230:18 126 252:10, 252:12, 253:13, 253:19 14 243:12 15 243:4, 244:7, 261:22 156 243:14, 243:18, 244:10 157 243:16 158 243:16, 243:17 16 284:2 1995 229:1, 260:17, 261:1, 262:22, 269:18, 270:11 2 20 251:10, 281:1, 283:22 20005 222:7 2019 220:11, 220:14 202.772 222:8 2020 220:18, 283:21, 284:2, 284:3 220 220:21 225 224:3 233 224:8</p>	<p>237 224:9 247 224:10 250 222:20, 283:20 265 224:11 284 220:21 29 263:17 3 300808 220:20 307 222:13 37 250:14 4 4,675,863 224:10, 246:3 40 263:11, 263:13, 263:14 400 251:7, 251:15, 251:17 42 263:18 5 5,276,686 224:9, 235:8 5,504,786 224:11, 264:4 50 241:20, 242:8, 242:10 500 251:7, 251:15, 251:17 543 232:17, 232:21, 233:14, 233:15, 236:7, 236:16,</p>
---	--	---	---

240:11, 279:7	248:4	
6	972.550	
65	222:22	
246:17, 246:18	972.722	
7	222:15	
7,221,904		
220:12		
7-united		
224:10		
718,543		
234:4		
75038		
222:21, 283:21		
75087		
222:14		
8		
8,718,543		
220:15, 232:22		
80		
242:9, 242:13,		
242:22, 243:1		
800		
250:20, 251:8,		
251:13, 251:19,		
252:1		
9		
900		
251:19		
904		
225:21, 226:18,		
230:16, 232:17,		
279:7		
94		
236:6, 237:10,		
237:16, 238:16,		
239:11, 240:5,		
244:17, 244:19		
95		
249:7, 249:8,		
249:20		
950		
250:20, 251:8,		
251:13, 252:1		
97		
247:12, 247:14,		